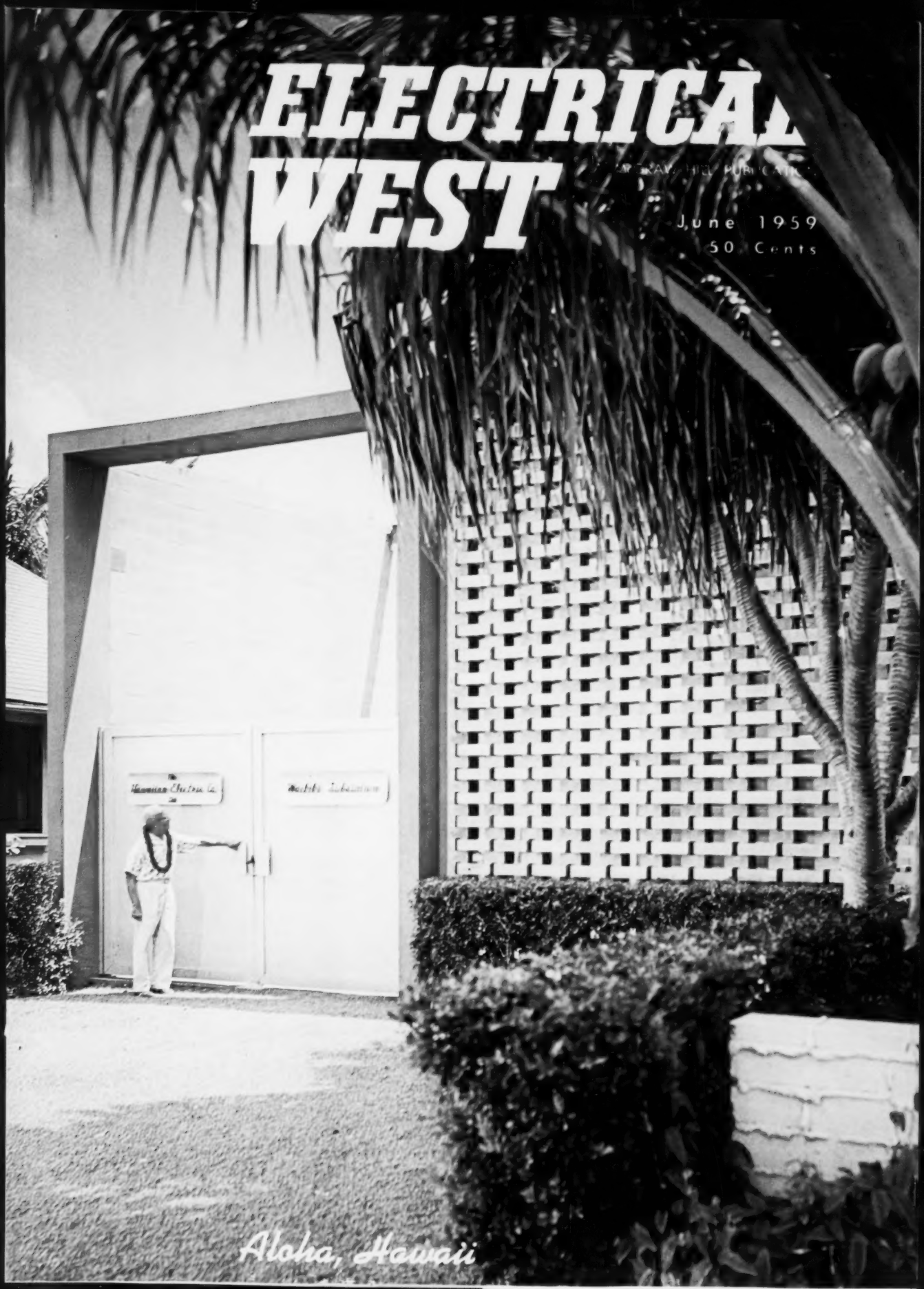
ELECTRICAL WEST

McGRAW-HILL PUBLICATION

June 1959
50 Cents



Aloha, Hawaii

RT&E Dual Voltage Transformers

are cutting labor time
and transformer replacement
costs for leading utilities
WISCONSIN ELECTRIC POWER CO.
CENTRAL LOUISIANA ELECTRIC CO.
SOUTH CAROLINA ELECTRIC & GAS CO.
KANSAS POWER & LIGHT CO.
COMMONWEALTH EDISON CO.
PUGET SOUND POWER & LIGHT CO.

RT & E

Introduced the *first* dual voltage transformer with external means of changing voltage.

•

Has the *most* dual voltage units in service.

•

Provides the *widest* variety of voltage combinations.

Since RT&E introduced the industry's first dual voltage transformer three years ago, an increasing number of utilities have joined the pioneer group who first installed these units.

Included among the many utilities who have installed RT&E dual voltage transformers are Commonwealth Edison Co., South Carolina Electric & Gas Co., Puget Sound Power & Light Co., Kansas Power & Light Co., Central Louisiana Electric Co. and Wisconsin Electric Power Co. RT&E has shipped over 5000 dual voltage transformers to these and other leading utilities.

RT&E is proud of the contribution it has made to the electrical industry through the introduction and promotion of the externally operated dual voltage transformer.

Available in all primary voltage combinations: 2400 x 4800 volts, 2400 x 7000 volts, 7200 x 14,400 volts, 4800 x 14,400 volts. Also custom designed to special requirements. See your RT&E representative, or address inquiries to Dept. A., Waukesha, Wis.

RT&E

ENGINEERING TALENT CONCENTRATED ON ONE IDEA — A BETTER TRANSFORMER

CORPORATION
WAUKESHA, WISCONSIN
PORTLAND, OREGON

For phone number of closest representative see advertising index in back of book.

AA

editorial views

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Point of No Return—Certain state public utility commissions, notably California's, make much of the philosophy of establishing rates based on zones of load density. From a strictly theoretical standpoint, it is obvious that the capital investment per customer is less in areas of high-load density than it is in more sparsely settled communities. Again, theoretically, the latter group of customers rightfully should pay a commensurately higher rate to offset the additional cost of service.

Practically it is impossible to prorate the billings so that each customer pays his proportionate share down to the last mill. All things being equal, rate schedules perforce must be based on intelligently calculated averages. Carried to their ultimate, zone rates could well be refined to the point where the cost of administration would more than offset the extra revenue yield. It would seem logical to permit the utilities themselves to present studies to the commissions indicating where this point of no return exists. Administrative and processing costs being what they are, it would appear easy to dissipate the relatively low differential between zone rates in extra bookkeeping. The price of paying for a wholly equitable rate for a relatively few customers can be high.

Get Aboard!—Industrial users of large electric motors have the best opportunity in many a year to hold down the cost of motors. Here's why. The chemist with his epoxies and silicones has shown the motor designer how to "seal" windings against moisture and contaminants. The result is that today's dripproof motor will operate in most areas that have required splashproof, weather-protected and totally enclosed motors. Think of the saving!

The big payoff will come with standardization. Manufacturers complain that standardization has not been possible because of the number of designs required to meet horsepower, speed and enclosure requirements. "Over 100 hp, we average just over one use per design for the catalog numbers we list," says one manufacturer.

The new insulation systems point the way to only two enclosures—general usage and explosionproof. That's a big step in cutting design costs through standardization.

Here is a chance for motor users to enjoy the profits that standardization has brought to distribution transformer users. Get the facts, then get aboard.

Breathing Spell?—State legislatures in Montana and Oregon defeated public power bills by only the smallest margin. In Oregon, for example, a bill to put the state in the power business failed to achieve passage by only two votes. This is hardly a victory for free enterprise because the proponents of socialized power will only work harder to swing the balance in their favor next time. **Far from being complacent, those who would stem the tide of socialized power should look upon this year's legislative results as merely an eleventh-hour reprieve that can only be made permanent by new perspectives, new approaches and redoubled efforts to sell the free enterprise story to an apparently indifferent public.**

For phone number of closest representative see advertising index in back of book.

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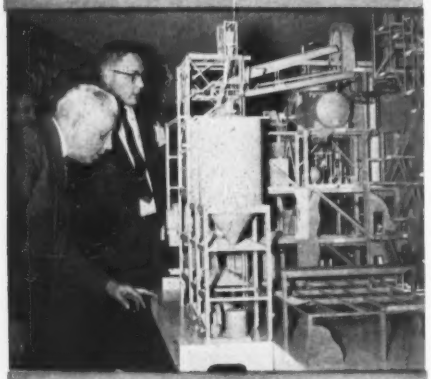

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ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S. Established 1887

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The Cover: Power supply for Waikiki beach is supplied through this substation. Careful landscaping by Hawaiian Electric Co. has preserved the natural beauty of the site. See story, p 63.

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Dick Alcorn, Bernice Johnston, Advertising Production Manager, 68 Post St., DO 2-4600.

Offices: Boston, Dallas, Detroit, Philadelphia, Pittsburgh, St. Louis

Electrical West (with which is consolidated The Journal of Electricity), June 1959, Vol. 122, No. 6. Published semimonthly except November when published trimonthly by McGraw-Hill Company of California, James H. McGraw (1860-1948) Founder. Office of publication, 235 N.W. Park Ave., Portland 9, Ore. See panel below for directions regarding subscriptions or change of address.

Executive, editorial, circulation and advertising offices: 68 Post St., San Francisco 4, Calif. Donald C. McGraw, chairman of the board; George C. Tenney, president; John W. Otterson, vice-president, B. M. Boccoli, secretary and treasurer.

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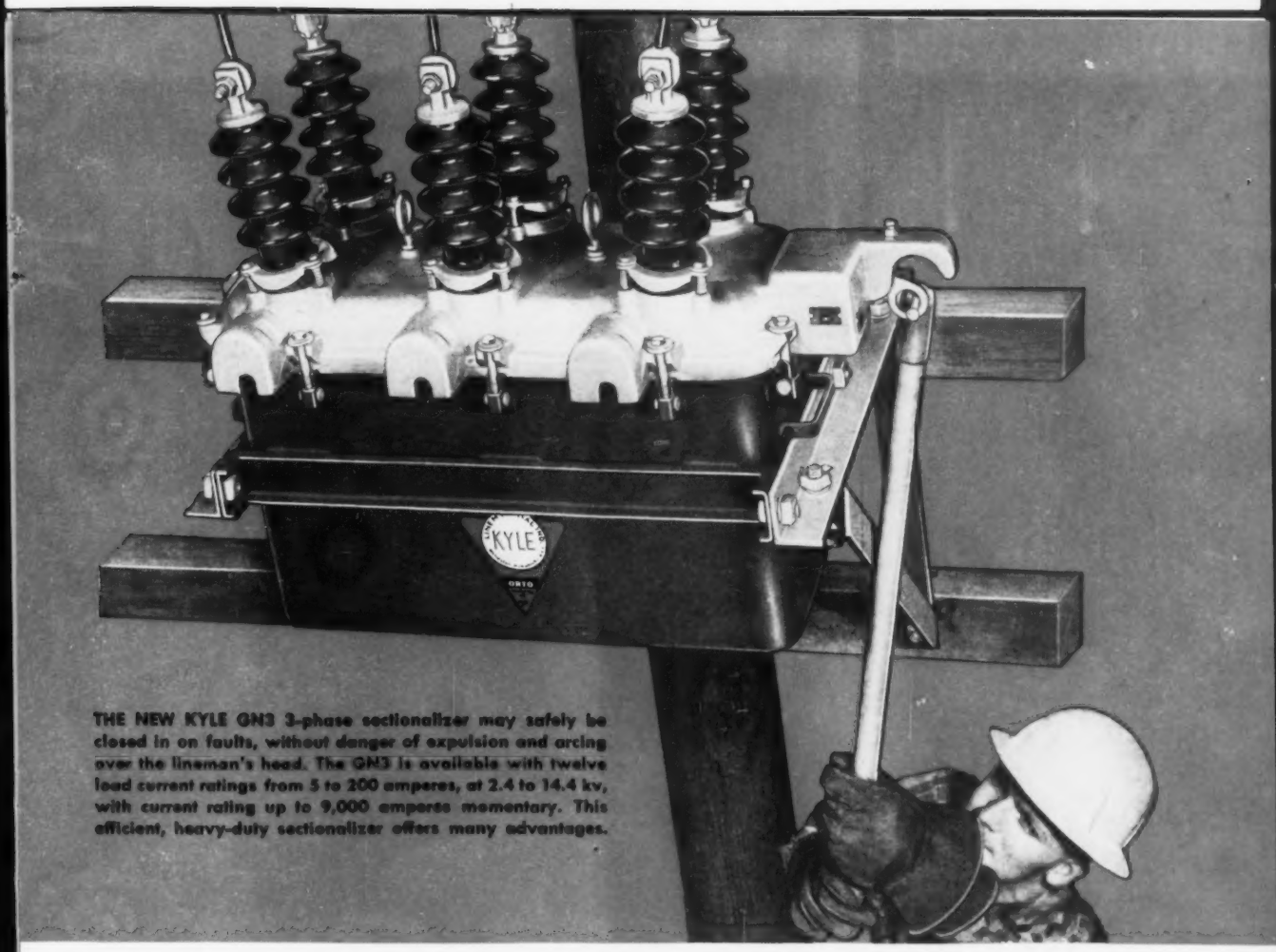


THE NEW KYLE GN3 3-phase sectionalizer may safely be closed in on faults, without danger of expulsion and arcing over the lineman's head. The GN3 is available with twelve load current ratings from 5 to 200 amperes, at 2.4 to 14.4 kv, with current rating up to 9,000 amperes momentary. This efficient, heavy-duty sectionalizer offers many advantages.

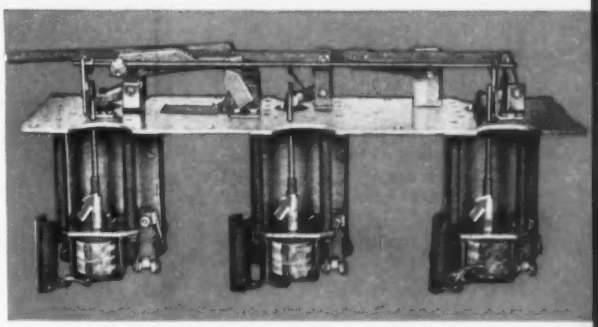
L-M Announces New Kyle Type GN3 World's First 3-Phase Sectionalizer

The new Kyle GN3 cuts service trips and saves engineering time because it simplifies coordination problems. It is safe for linemen to operate, when closing in on a fault. The GN3 is the first 3-phase sectionalizer on the market.

Kyle sectionalizers operate, and lock out, while the back-up recloser is open. The GN3 incorporates single-phase counting with positive internal interphase linkage for 3-phase lockout in a single tank. The GN3 may be set to lock out after one, two, or three operations of the recloser. This adjustment is very simple; it may be made in the field if desired.

Get Complete Information

Discuss the use of sectionalizers instead of fuses with your associates. The GN3 can offer some marked savings and operating advantages. Ask the L-M Field Engineer for complete information, or write for bulletin. Line Material Industries, Milwaukee 1, Wis. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.



COMPLETE GN3 MECHANISM lifted out of the tank. To set to lock out after one, two, or three operations of the backup recloser, simply re-index each trip piston extension of the sectionalizer (arrows). With interphase linkage inside the tank, there is no possibility of misalignment or operating difficulty because of corrosion or icing.

LINE MATERIAL® Industries Kyle® Switchgear

McGRAW-EDISON COMPANY

397

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS
POWER SWITCHING EQUIPMENT • PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

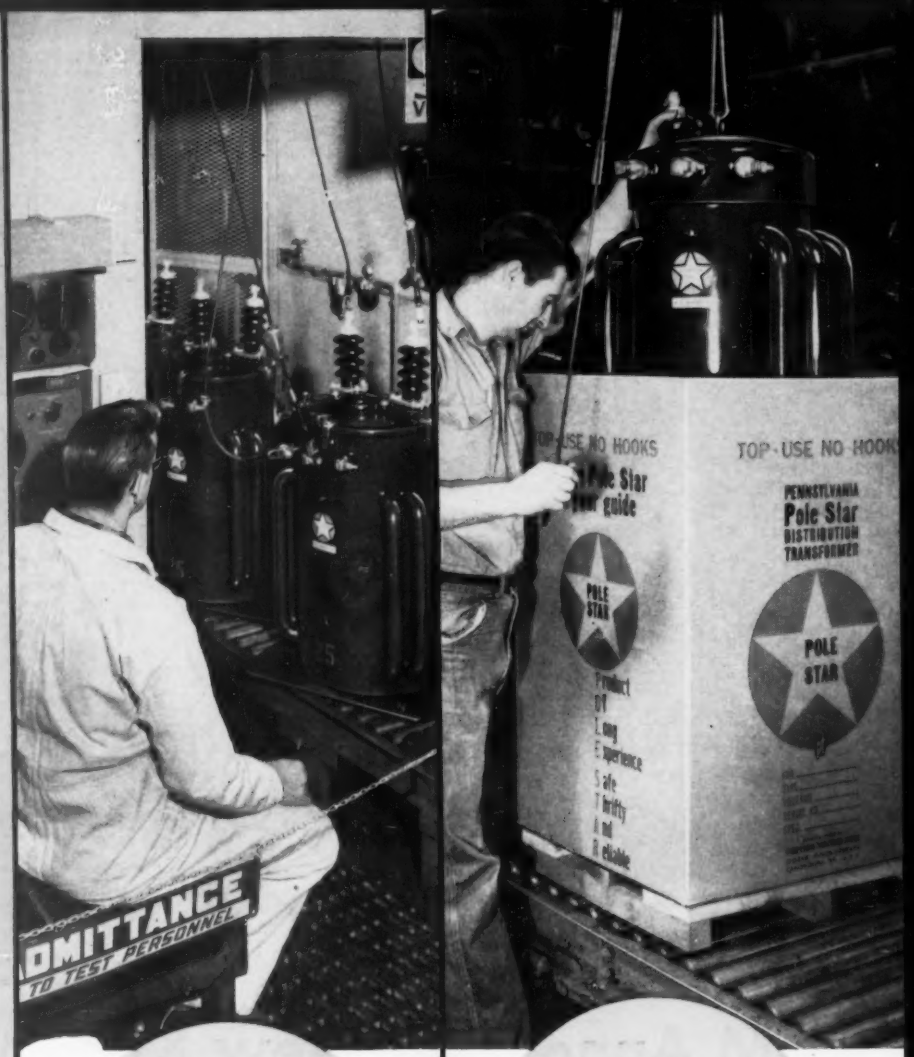
McGRAW EDISON

Product innovations and experimental programs...

POLE STAR'S

continuous contribution to distribution transformer progress

POLE STAR



Production-line impulse testing detects even single-turn faults

One of the first manufacturers to begin production-line impulse testing of distribution transformers (in 1956), Pennsylvania Transformer does so with no protective strings attached: that is, Pole Stars are tested *without* arresters. The apparatus used is so sensitive it will detect even single-turn faults. Result: a high-quality transformer is made even better, and purchasers are assured of the greatest possible uniformity of performance.

Perfect Seal Pole Stars are shipped in special corrugated cartons

A double test has been taking place with the shipment of hundreds of Perfect Seal Pole Stars to utilities throughout the country. The completely sealed units—destined for "in service" observation and testing—are being shipped in specially designed corrugated cartons. Advantages of the impact-tested, weatherproof containers—such as better protection, easier disposal and lighter weight—are being carefully checked against customers' experiences and comments.

LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

Pioneer of "higher kva" pole-mounting introduces new 250-kva featherweight

In 1953, Pennsylvania pioneered the pole-mounting of transformers above 100 kva by introducing the Featherweight Pole Star 167-kva unit—an innovation so emulated that industry standards soon were changed to include pole-mounting of 167-kva units. Now, Pennsylvania announces the extension of pole-mounting provisions to 250-kva Pole Stars up to 15 kv. This new Featherweight Pole Star offers the same ease-of-handling features as its 167-kva forerunner.

Experiments with aluminum typify never-ending search for new, better materials

Never content with past accomplishments, Pole Star engineers are constantly searching for even more effective methods, designs and materials. Considerable experimentation has been done, for instance, with aluminum—as a conductor in both oil-immersed and dry-type coils, and as a material for tank covers. Whether measured in terms of later applications or of additional knowledge, the results of such experiments help to assure continued product improvement.

New Pole Star regulator combines direct drive with 32-step regulation

The recently introduced Pole Star Regulator is the only 32-step distribution size regulator that offers a direct-drive tap changer. Based on Pennsylvania's service-proved power-transformer load tap changers, the mechanism features an index-plate method of positioning contacts that assures optimum switching speed, with consequent minimum arcing and extra long life.

PENNSYLVANIA TRANSFORMER DIVISION
McGRAW-EDISON CO.
McGRAW-EDISON
CANONSBURG, PENNSYLVANIA
GREATER PITTSBURGH DISTRICT

EW news roundup

AS OTHERS SEE US — A recent visitor from Great Britain who came to the U. S. to study American engineering educational methods is quoted in the *British Electrical Review* as follows:

"As a general rule it is argued that the American high school student of 18 years of age is about the same standard as the British grammar school boy of 16 years of age. . . An acute shortage of first-class teachers of science and mathematics exists and there is even less encouragement to recruitment than in Britain because the teaching profession is not held in very high esteem." Need we say more?

—EW—

Television will be on Continental Airlines Golden Jets June 8 on the non-stop Chicago to Los Angeles service. A 17-in. set will be installed in first-class lounges of the planes. You can't get away from it.

— EW —

COSTLY WORDS—A recent article in *Sales Management* points up the costs of office correspondence. The cost of dictating and mailing a letter runs between $2 and $2.50—even higher if written by executives. If your company mails 250 dictated letters daily, the annual cost is $133,900—an expense that could be cut by 30% with a little better organization of thinking and dictating on the part of the writer.

—EW—

DUBIOUS HONOR—Addressing a Syracuse audience L. F. Hickernell, president of the AIEE, stated "the U. S. government, which has been termed 'the largest business in the world,' is composed of 2,100 separate agencies. To give you some idea of the complexity of our Institute, we have 55% as many organizational units as the government has agencies . . ."

Frank A. Bewley of Santa Clara, Calif., sent us to the dictionary when he wrote ". . . not exactly lebensraum" in reference to this odd-appearing pole line. He was right. Lebensraum means "a place in which to live and grow" and the pole line is about to be moved to make way for expansion of Oak Hill cemetery. Hill-leveling caused the humping

PREDICTION—Philip Sporn, president of the American Electric Power Co., is not quite as optimistic about the future of nuclear energy as many of his contemporaries. He told a national coal policy conference that, by 1975, energy consumption by the electric utility industry will account for about 25% of the total energy requirements of the United States. By that time, he predicted, nuclear power will provide no more than the equivalent of 50,000,000 tons of coal for electric power generation. However, by the year 2000 nuclear power is likely to provide the equivalent of 855,000,000 tons of coal.

—EW—

LIMITS LOWERED—The Atomic Energy Commission has approved issuance for public comment of proposed regulatory amendments that would reduce the permissible total external radiation exposure to any worker by two-thirds. The present limits per year are a 15 roentgen equivalent man while the new standard would be an average of 5 rems per year and not more than 12 rems in any one year. For individuals outside controlled areas and for all persons under 18 years of age the maximum permissible radiation doses and concentrations in air and water would be one-tenth of the recommended permissible values for radiation workers. The changes in the accumulated maximum permissible doses are not the result of positive evidence of damage but rather are based on the desire to bring these recommendations in accordance with trends of scientific opinion.

—EW—

CURE—Company doctors may want to consider a mass prescription for line crews troubled by poison ivy. The prescription—(and not written in Greek) Aqua-Ivy Tablets.

The pills, when tested on a group of Coast Guardsmen, indicated that 95% developed complete immunity in six weeks, with no side effects. Further tests indicated immunity lasted at least 10 months.

Indications are that if treatment is continued for two seasons a permanent immunity will develop.

—EW—

THERMOELECTRIC PROGRESS—What is reported to be the most efficient thermoelectric material yet developed is described by Westinghouse as a chemical compound of high purity indium with equally pure arsenic and phosphorus.

It is for use in temperature range from 850 to 1,500 F, a top tempera-

Balance... the measure of cable superiority

Every brand of cable *must* have certain important electrical characteristics. But not every brand will have these characteristics in the *same* relative proportions... and it's this fact that makes a difference in cable life and performance. Look at these significant test results.

	BRAND			
	CAROL	A	B	C
Electrical Insulation Resistance (1)	100	17	16	68
Cold Bend °F (2)	—50	—45	—90	—50
Abrasion Resistance (1)	91	62	100	92
Ozone Resistance (1)	100	6	18	12

Note: (1) 100 indicates best—others % of best (2) cold bend—actual test temperature

Note how, in Brands A, B and C, there is a marked lack of *balance* between abrasion resistance and ozone resistance. This means that these cables can crack long before they wear out. Also, it is quickly apparent that needlessly high cold flexibility may be built into a cable... *but at the sacrifice of more important electrical properties.*

But Carol cable, in addition to having the highest *combined* rating, is also the best *balanced*... with primary emphasis on the characteristics most vital to cable life and performance. The *balance* built into Carol cables is your assurance of superior quality *throughout*... *extra* quality and performance where it is most needed.

When you call for cable—call for Carol!

PORTABLE CORDS • POWER SUPPLY CABLE • CONTROL CABLES • WELDING CABLE • GOVERNMENT TYPES • CORD SETS

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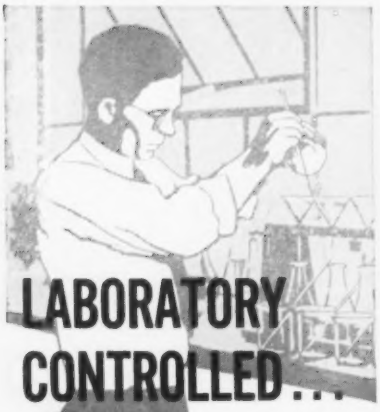


LABORATORY CONTROLLED...

Crapo

GALVANIZED STEEL STRAND FOR GUY, MESSENGER and OVERHEAD GROUND WIRE

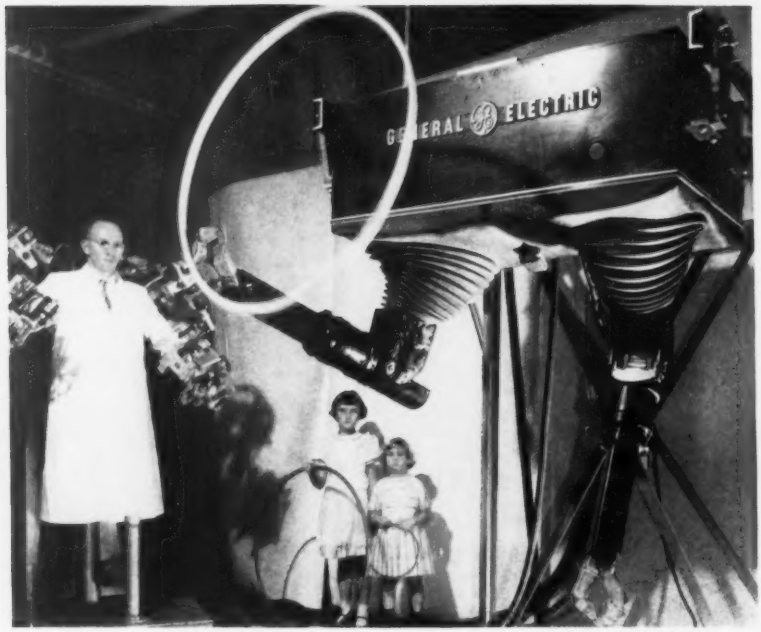
The high, uniform, consistently-dependable quality of Crapo Galvanized Steel Strand is the direct result of close laboratory control over each step in manufacture. All wires used in forming a particular size and grade are produced from steel of selected analysis, carefully processed under technical supervision and stranded on precision machines. Both wire and finished strand are subjected to prescribed laboratory tests to insure the desired end result.

Heavy, uniform, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide maximum resistance to corrosion.

Write for booklet OG-25 containing "Sag and Tension Data for Overhead Ground Wire."

INDIANA

STEEL & WIRE CO., INC., Muncie, Indiana



"Handyman" is the name General Electric has given to this hydromechanical master-slave. The picture demonstrates that the robot is nimble enough to whirl a hula hoop better than children, which is a claim that most live adults cannot make. G-E's Ralph Mosher is in the master unit. Children are Kathy Dumas, 6, and Mary Elizabeth Murphy, 5. Handyman will be used by the company's aircraft nuclear propulsion department at the Atomic Energy Commission's National Reactor Testing Station near Idaho Falls

ture that is well above the melting point of aluminum, magnesium and many common thermoelectric materials.

Dr. Raymond Bowers, Westinghouse research physicist, said: "Its successful development now brings us into the range of operating temperatures where the extremely high-temperature mixed-valence thermoelectric compounds can begin to take over."

—EW—

ATOMIC GUIDE – Stanford Research Institute, under a contract to the U.S. Atomic Energy Commission, has completed an instructor's guide "Survey of Nuclear Energy and Power Plant Application."

The resulting manual will help supervisors and instructors teach workers what they need to know in order to perform their jobs with maximum efficiency, to care for expensive equipment and to protect themselves and their fellow workers from potential hazards in working around and with reactors.

Already the Los Angeles Trade-Technical Junior College has announced a new course of study for adult education based on the findings of SRI's work.

WRONG PLUM—The National Society of Professional Engineers has protested the appointment of Dr. A. L. Miller as the director of the Office of Saline Water replacing David S. Jenkins, a graduate civil engineer.

Miller, a physician turned politician who was defeated in the 1958 elections, was appointed to the position by Secretary of the Interior Fred A. Seaton.

In his protest Paul Robbins for the NSPE stated, "We can think of few, if any, federal programs which are so clearly engineering projects under any reasonable interpretation of Congressional intent and actual operation."

—EW—

NARROW SQUEAK – Fast action by more than 100 Merritt-Chapman & Scott workers saved the life of a fellow employee when he was trapped on a bulldozer by a snow slide recently.

Warren A. Zwicker was clearing snow from the Newhalem-Diablo highway so work could proceed on Seattle City Light's high Gorge Dam. A small slide hit the bulldozer, pinning his legs beneath the controls. A fellow employee, attempting to extricate Zwicker, had to flee for his

DOSSERT UNDERGROUND CONNECTORS...

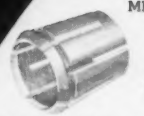
the versatile line

featuring:

- Fully molded, no factory taped joints.
- Insulated with MYPAR* rubber for higher quality and longer life, or MYPRENE* rubber for higher temperature resistance, and greater resistance to acids and oils.
- Made of high conductivity copper, insuring cool operation.
- Interchangeable with all standard underground connectors and their component parts.
- Made to fit standard compression tools.

MICON* type MC

MICON COMPONENTS

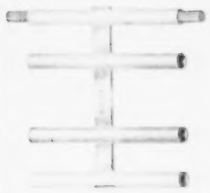


Tapered Compression Sleeve type C

Cable Receptacle type MA

Insulating Sleeve for MICON Outlet type MIS

Insulated Crab Connector type CBR

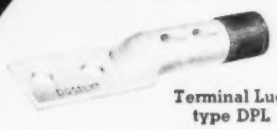


Uninsulated Crab Connector type CBN

MICON Stud Connector type MCBS

Limiter Link Assembly type LLA

Limiter Link Assembly type NLRA



Terminal Lug type DPL

Comp. Coupler type DPC

Comp. Tee Coupler type CRT

*U.S. Reg. Trade Mark

Write for illustrated catalog. →

50 YEARS OF TECHNICAL KNOW-HOW

DOSSERT MFG. CORP.

249 Huron Street, Brooklyn 22, N. Y.

Representatives in all principal cities

For phone number of closest representative see advertising index in back of book.

PULL WIRE IN
Minutes
...NOT HOURS!

WITH THE *Jet Line Gun*

Eliminate fish tape and the long hours spent in snaking!

Use the Jet Line Gun to shoot a strong nylon line through conduit . . . then draw polyethylene rope through and you're ready to pull wire . . . in minutes, not hours!

A small jet-propelled cartridge does the trick, twisting around ells and bends, up and down as it lays the nylon line in runs up to 300 ft. . . . double this distance when shot from both ends of the run!

The Jet Line system is safe . . . there's no powder charge or explosion . . . and both nylon line and polyethylene rope are non-conductors.

The Jet Line system is accurate. You can't waste wire because the polyethylene rope is marked in feet to measure the exact length of wire you need.

The Jet Line Gun was invented by experienced electricians and is now in use by thousands of contractors. It replaces fishing in rigid and flexible steel conduits, under-floor ducts, cavity wiring structures and underground ducts. Goes through floor boxes and C conduiets.

Order your Jet Line Gun kit today and save time, money and wire on your jobs from now on.

Ask your distributor or write

Pat. Pending on Method and Apparatus

Jet Line Gun Company
730 Seigle Ave., Charlotte, N. C.

3277

Copyright 1958 Jet Line Gun Co.

life when a second slide covered the bulldozer with more than 10 ft of snow.

One hour and 25 minutes after being trapped, Zwicker was removed. A steel top on the bulldozer formed an air pocket and held off the pressure of the snow, saving him from serious injury.

—EW—

HOPE SPRINGS—A recent survey among 1,900 electronic engineers shows some interesting results in earning averages:

Age group:	25-29	$ 7,675
	30-34	$ 7,700
	35-39	$11,250
	40-44	$11,030
	45-49	$10,983
	50-54	$12,235
	55 and over	$13,927

If the figures are correct, the pre-35 flat spot apparently reflects the ever increasing out-of-college offers without adjustments up the line. The decline in salary average from 35 to 50 also raises questions regarding adjustments for older, more experienced engineers. Also of interest—each age group expects to be earning 3-4,000 more at the end of five years.

—EW—

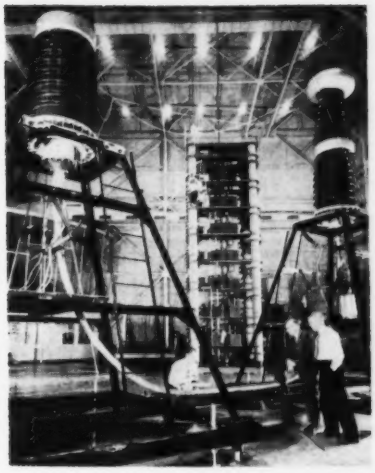
Ted Stipp, electrical engineer in the design and construction division of Los Angeles Department of Water & Power, has developed a special computer for calculating estimated underground cable temperatures. He might be kind enough to tell you whether it is available, if you're interested.

—EW—

ELBOW ROOM ONLY—Dr. Frank E. Myers, associate director of the Argonne National Laboratory, discussing our increasing population, said, "with the numbers before me, I couldn't resist indulging in that scientifically disastrous pastime of extrapolating a curve. According to my slide rule, by the year 2959 A.D. there will be about one square yard of land for each person, assuming the present population trends continue."

—EW—

MOLECULAR GENERATOR — Russian physicists have developed a molecular generator with such a stable output that it could power an electric clock accurate to within one second in 300 years—according



Anaconda Wire & Cable Co. has opened a new extra high voltage research laboratory at Hastings-on-Hudson, N.Y. Cost of the impressively equipped lab was $1,750,000

to Soviet reports. Power is supplied by radio waves emitted by molecules of ammonia. Unlike the parts contained in electron generators, these molecules never deteriorate or age and their vibrations are usually stable. The Russians plan to use the new devices in precision timepieces, extra-long-range radar, and as a basis for measuring physical and engineering values.

—EW—

DEFIBRILLATOR — The Edison Electric Institute has announced the successful development of a device for use in treating interruptions of the normal heart rhythm. The human heart can be thrown into a state known as ventricular fibrillation as the result of administration of anaesthesia, from a mechanical touching of the heart, the lowering of the body temperature or from electric shocks. The heart rarely recovers spontaneously from ventricular fibrillation. The new device permits restoration of the normal heart rhythm by means of electric currents sent through the heart from electrodes placed on the surface of the chest. Work is being done at Johns Hopkins University toward the development of a small portable defibrillator for use in hospital wards and in the public utility field.

—EW—

ATOMIC SUPERHEAT—The Los Alamos Power Reactor Experiment No. 2, designed to produce superheated steam in one simple oper-

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"Snap"
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Any hands are expert
No special skill is needed to expertly apply Superformed Products. When the last rod snaps into place you are assured of permanent, full-length gripping protection against mechanical and electrical damage.
The unexcelled Superforming process of making helical reinforcements is another development of Fanner's long years of specialized wire-forming experience. Write for catalog showing complete lines.
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Now . . . a complete new line

15 Ampere

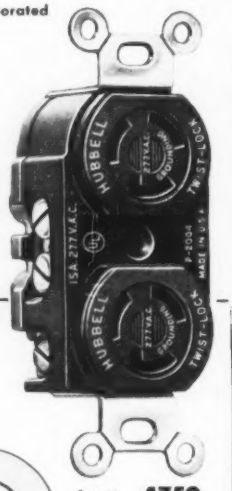
277 VOLT

GROUNDING ONLY *Twist-Lock*®

for fluorescent lighting applications

listed by Underwriters' Laboratories, Incorporated

This exclusive new Hubbell line of caps and receptacles is specifically designed for 15 amp., 277 volt circuits widely used for fluorescent lighting. The devices are *non-interchangeable* with regular "Twist-Lock", 4700 line, grounding (15 amp., 125 volt) "Twist-Lock" or any other device on the market.



Cat. No. **4750**

Evolution of 4750 Configuration

Original 3-wire Standard 7580 "Twist-Lock" 10 amp., 250 volt; 15 amp., 125 volt

followed by . . . NEMA Grounding-type 15 amp., 125 volt with U-shaped slot

and then . . . Hubbell's new 4700 "Twist-Lock" 15 amp., 125 volt for Grounding only

and now . . . Hubbell's Grounding "Twist-Lock" for 15 amp., 277 volt only designed for fluorescent lighting

Cat. No. **4750** . . . the only 15 amp., 277 volt duplex locking and grounding receptacle on the market . . . feeds two fluorescent fixtures from one single gang box . . . cuts number of receptacles and boxes in half . . . saves hours of installation and maintenance time.

For complete information write

HARVEY HUBBELL, INCORPORATED

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For phone number of closest representative see advertising index in back of book.

ation, is now undergoing operational tests. This is a unique homogeneous type of reactor experiment to determine the feasibility of using a solution of enriched uranium phosphate, phosphoric acid and water as a fuel and relying on natural circulation of the solution to carry the heat to the heat exchanger where high-pressure, superheated steam is produced.

In addition to employing only natural circulation of the fuel, the reactor is of interest because the structural metals in contact with the solution are gold-cladded to inhibit corrosion.

—EW—

ENGINEER SALARIES—A salary survey conducted by the Engineers Joint Council reveals the 1958 median salary of engineers ranged from $6,125 for engineers of one-year experience to $11,000 for those of 20 years' experience. The over-all median was reported to be $8,750 a year, compared to $7,750 in 1956 and $6,500 in 1953. Copies of the report are available from the Engineering Manpower Commission, 29 W. 39th St., New York 18, N. Y., at $3 a copy.

—EW—

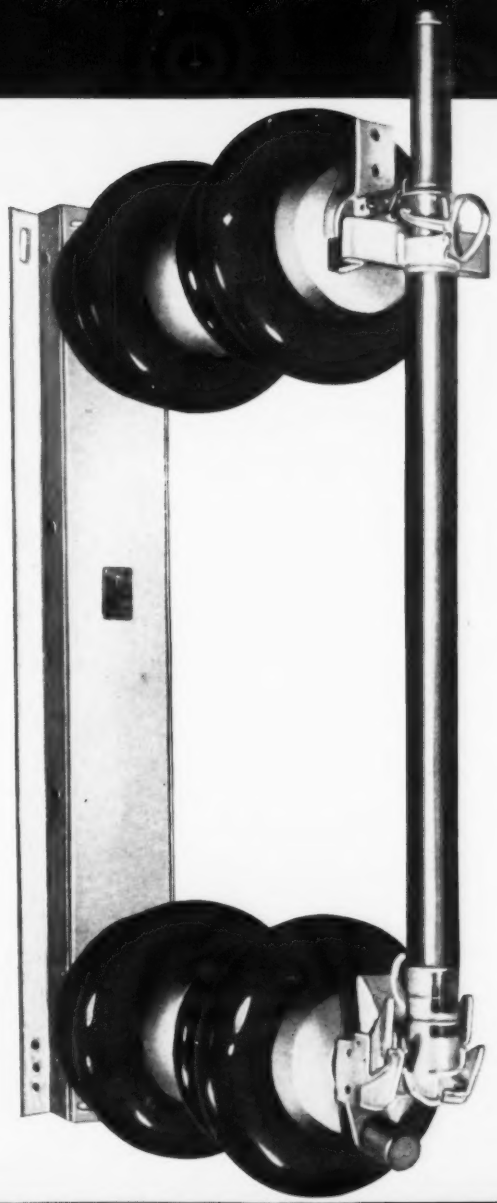
MODEL LAW—At the spring Western zone meeting of the National Council of State Board of Engineering Examiners held in Salt Lake City recently a model law to provide states with patterns for applying engineering qualifications and standards in licensing was discussed by delegates. The model law is designed to provide a framework for applying examination criteria in years ahead.

The purpose of meetings of this kind is to provide degrees of uniformity in state engineering requirements and to seek reciprocity agreements on qualified engineers on an interstate basis.

—EW—

GYRO LOCOMOTIVE—The British are experimenting with a gyro-operated line locomotive. It consists of a 1½-ton flywheel and a three-phase twofold squirrel-cage induction alternator excited by capacitances. This drives two 25-kw, 50-cycle squirrel-cage traction motors with 4, 6, 8 and 12 poles. It is charged with mechanical energy at each end of a 30-minute run, during which time it hauls and shunts empty cars and returns with full cars.

1,500,000 kva at 69 kv!



a breakthrough in power fuse short-circuit protection

A completely new principle in boric acid circuit interruption has been incorporated into the new SMD-2A Power Fuse. It gives you interrupting ratings 50% higher than any other high-voltage power fuse.

Like other members of the SMD family, it provides:

1. system protection,
2. transformer protection against secondary faults, even line-to-ground,
3. use of transformer short-time daily overload capability,
4. use of transformer short-time emergency overload capability, and
5. complete and precise coordination with other overcurrent devices.

While doing this, it also gives:

—Dependable operation regardless of type of system, type of fault, or type of application; and regardless of system, or atmospheric conditions.

—Maintenance-free performance, since there is no need to replace fuses on other phases when one fuse blows. No periodic replacement program is required to prevent "sneak outs" caused by vibration, ageing, or corona.

For additional information write to: S & C Electric Company, 4425 Ravenswood Ave., Chicago 40, Ill. In Canada: S & C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario.

S&C POWER FUSES

Here are answers to some about KPF switches

Q. *How can KPF switch blades maintain positive contact with switch clip under changing line sag conditions?*

A. Two heavy copper clips, bolted to a shoe carrying the flexible jumper, are mounted inside a special "horseshoe shaped" casting by two toggle bolts. These toggle bolts pass freely through the outer leaves of the clips, and the entire contact assembly "floats" on these bolts. Half-spherical bolt heads and adjusting nuts permit movement in any direction. The tension of the clip leaves on the blade is sufficient to insure positive alignment, since either clip or blade can follow the other to conform to line sag changes.

Q. *How can insulator stacks follow normal line sag changes?*

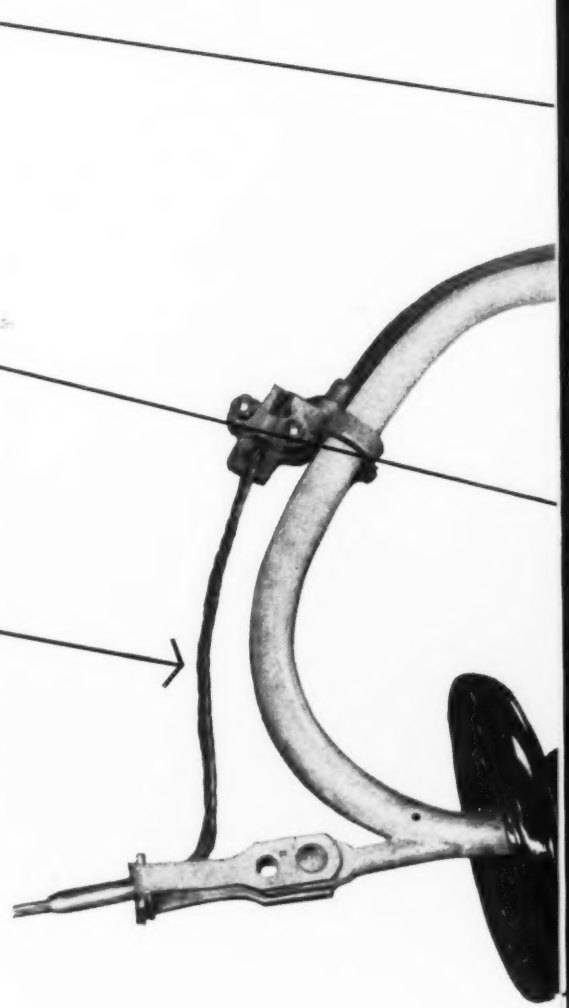
A. The insulator stack bearing units may be likened to limited universal joints. The actual bearing, a monel pin in an everdur trunnion, allows 90° movement of the rotating arm of the phase unit, as well as approximately 7° vertical movement to follow line sag. It is impossible for the bearing to bind under normal line stress, and insulator stacks always follow the sag of the conductor.

Q. *How are conductors connected to KPF switches?*

A. With KPF Type A switches, the user eliminates dead-end insulators. Any standard strain clamp can be used, and hot lines may be dead-ended directly to the phase units. Switch arms and dead-end eyes are integral with the insulator assembly. The conductor is lead through the strain clamp and on to a copper terminal on the switch arm. Aluminum conductors may be connected to the switch arm through special KPF terminals designed for this service. Type A switches may be mounted on a separate crossarm with conductors deadened below or above (for angle-pole installations, etc.). Switch operates equally well with or without line tension.

Q. *For what voltages are KPF air break switches available?*

A. KPF Type A and S standard "line-tension" switches are available for common voltages from 7.5 to 110 KV. Special switches combining a disconnect with a fuseholder (Type UF, double-cross-arm mounting) and for use where line tension is not present are also offered in these same voltage ranges. Ground switches are available for Type A or S switches. Type R switches are offered for use where line tension is not present or it is desired to use a specific type of apparatus insulator.



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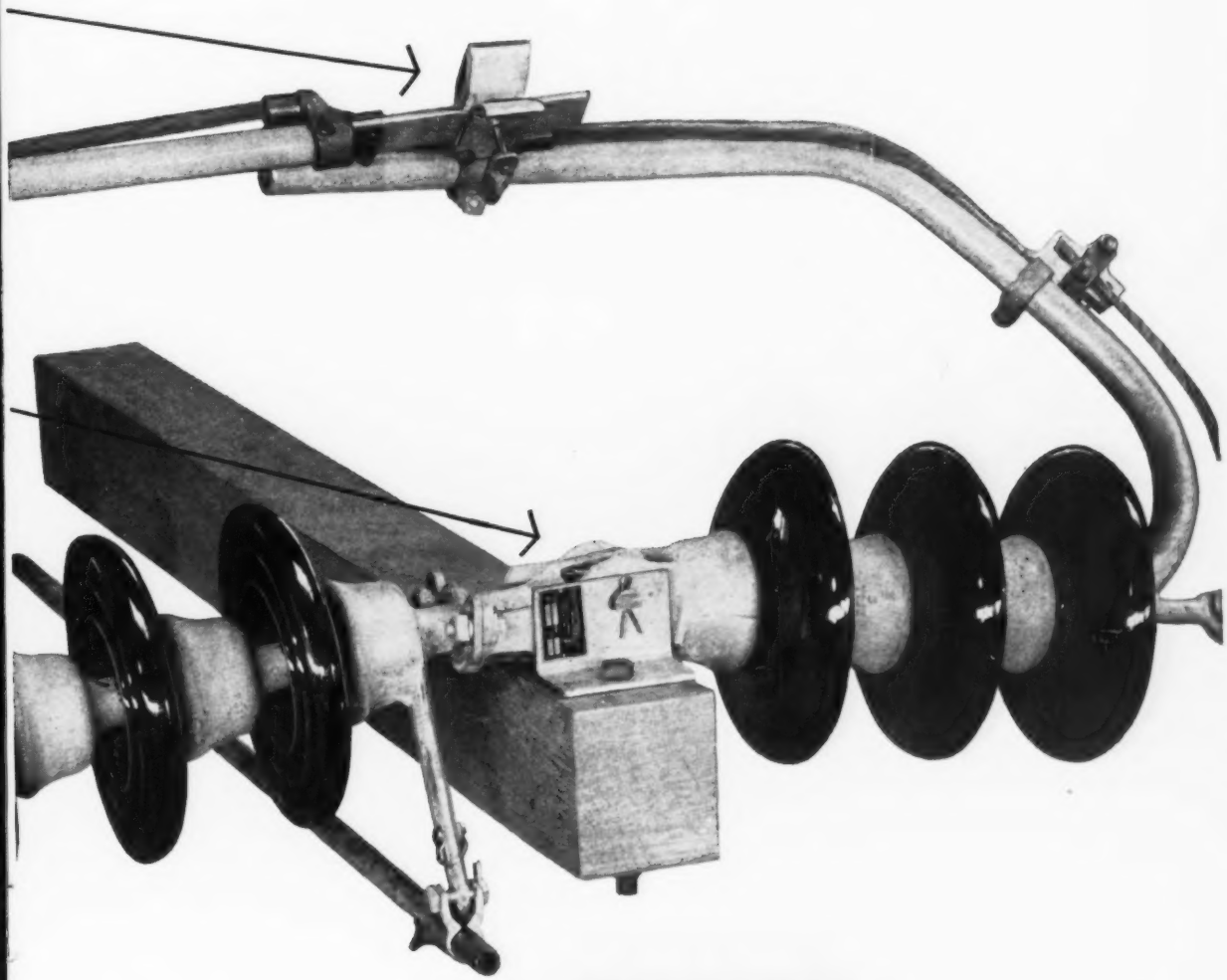

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Standard for half a century

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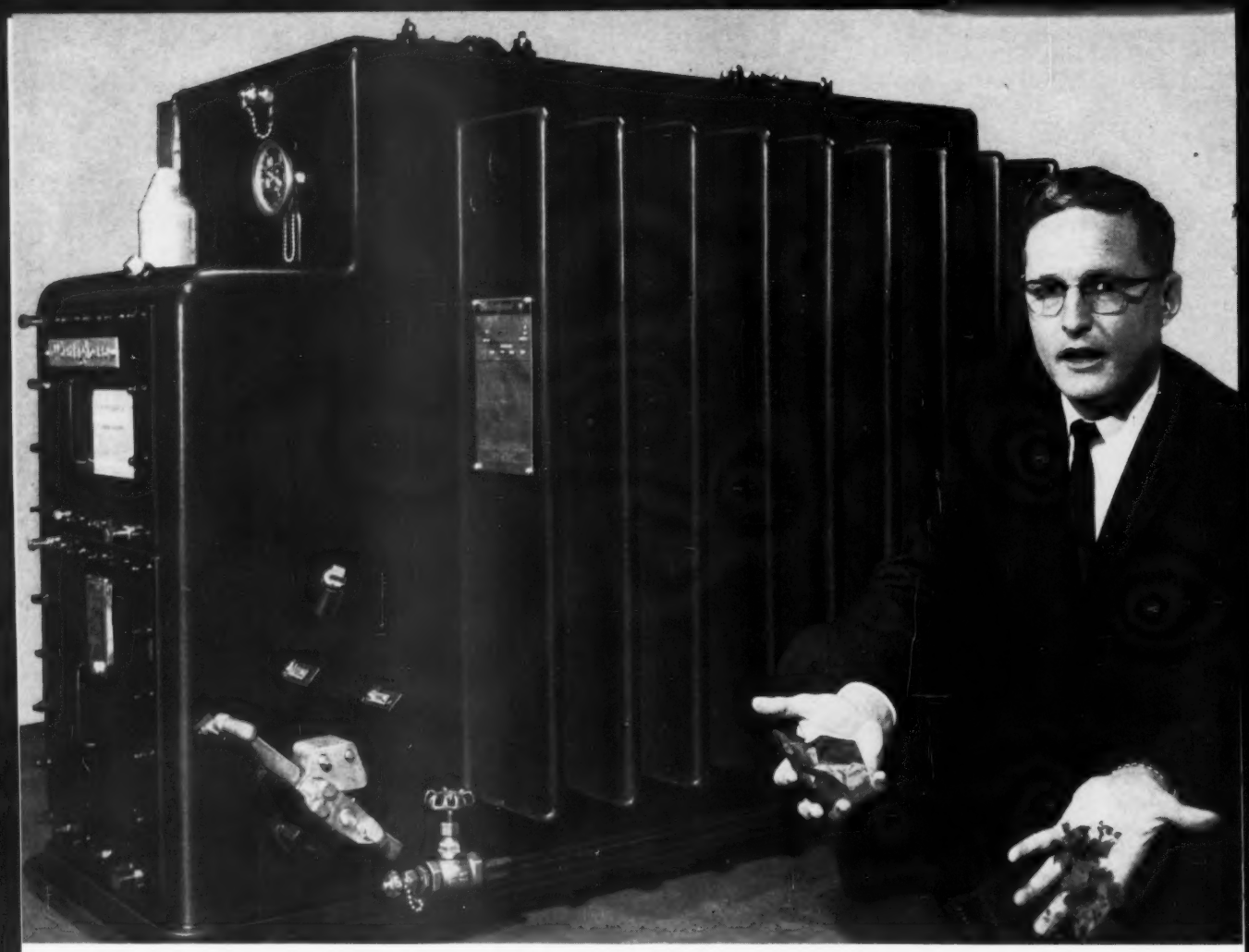

The "Crumble Test" proves superior heat resistance of Westinghouse Insuldur-system insulation . . . J. C. Gardner, Westinghouse network transformer representative at the Sharon, Pa., plant, demonstrates how overload and summer heat can "kill" insulation in transformers without the Insuldur system . . . while Insuldur system "stays alive."

Higher ambients, same overloads...but no heat damage

WITH WESTINGHOUSE SPACE-MISER NETWORK TRANSFORMERS

Now . . . Insuldur system guards insulation life in Westinghouse Space-Miser network transformers

Heat is the major threat to transformer insulation life —whether from emergency overload conditions or high summer ambients.

The new Insuldur* insulation system now available in Westinghouse oil-immersed Space-Miser network transformers reduces the heat threat from both sources.

Now, higher emergency overloads can be carried without fear of shortening insulation life . . . because Westinghouse network transformers with the Insuldur system operate *safely* at temperatures up to ten degrees higher than previous safe temperature limits.

Summer heat wave problems are reduced, because load-carrying ability is assured for ambients up to ten degrees higher with the Insuldur system.

The Insuldur insulation system is a Westinghouse exclusive—no other network transformer has this positive insulation-life protection.

Westinghouse oil-immersed network transformers with the Insuldur insulation system retain dollar-saving flexibility . . . easy future change to Inerteen® should the need arise.

Ask your Westinghouse representative about the Insuldur insulation system . . . a "Bonus Value" from Westinghouse Plowback of Earnings into research.

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PRODUCT NEWS

New Designs and Applications

Static Relay

(1) *Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.*

This company's new protective relay makes use of commercially available semiconductor devices such as diodes, transistors, thermistors and varistors. These components are combined with conventional circuit elements such as resistors, capacitors and transformers. The static relay combines within one device characteristics that simulate to a predetermined degree the heating and cooling of a specific electrical device and will still function with sufficient speed in case an extremely high overcurrent should result from insulation failure. The static relay is said to be shockproof. Static relays can be made to respond to voltage, power and phase angle. Translation of pressure, temperature and light into discrete electrical quantities is possible with suitable control units.

Reel Carrier

(2) *Petersen Engineering Co. Inc., Santa Clara, Calif.*

A newly designed single-axle, powered reel carrier that loads and unloads and hauls reels up to 18,000 lb and to 8 ft in diameter is announced by this company. Although the unit requires 10 ft in over-all width to carry the large size reels, it reduces 8 ft for moving from site to site. A one-cylinder engine raises and lowers the reel and provides power to turn the reel backwards to wind the loose end of the conductor back for unloading and moving.

Mobile Power Plant

(3) *A. G. Schoonmaker Co., Foot of Spring St., Sausalito, Calif.*

This company produces a 300-kw, diesel-electric power plant on wheels for use as an emergency power source or temporary power source of standard voltages. Components are a General Motors 450-hp diesel engine and a Westinghouse 300-kw, 375-kva electric generator complete with switchgear and radiator.

Jumper Clamp

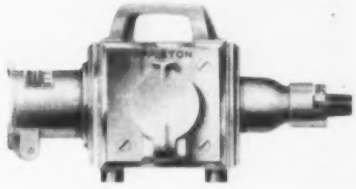
(4) *James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.*

An extra-wide range jumper clamp is now in production by this company. All conductors from 6 solid through 1,192.5 mcm ACSR or 1,300 MCM stranded are accommodated. Current rating is 400 amp. The 4-lb, 26½-in. long tool has an aluminum alloy head and a 14-in. fiber glass handle over a plastic-covered, laminated wood operating pole. An external T-bolt terminal takes jumper cable up to 4/0 15,000 v.

Safety Kit

(5) *Mine Safety Appliances Co., 230 N. Braddock Ave., Pittsburgh 8, Pa.*

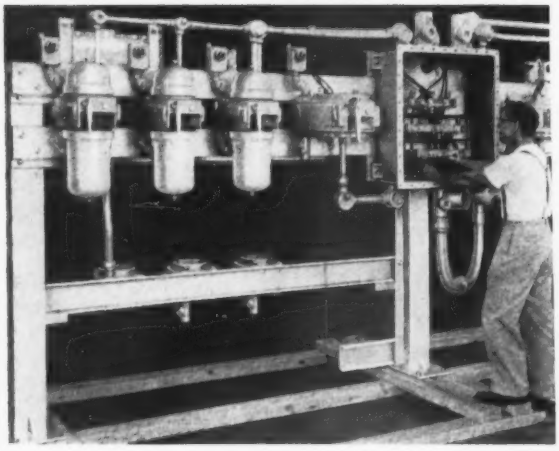
This manufacturer and General Telephone Company of California have developed an instrument kit to test for explosive and toxic conditions in manholes. Only three minutes are required to complete the test with the new unit.



Current Tap

(6) *Appleton Electric Co., 1701 Wellington Ave., Chicago 13, Ill.*

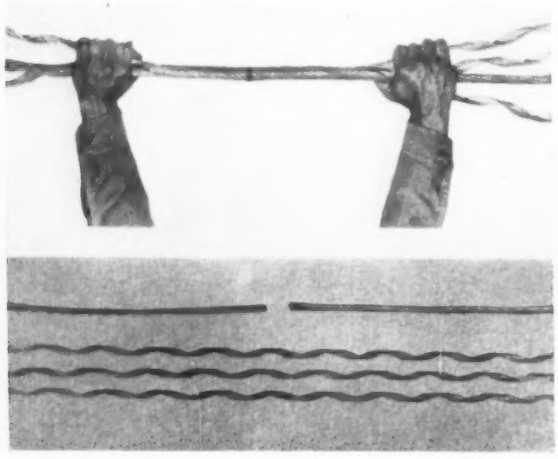
In locations under class I, groups C and D with hazardous areas, this single, portable current tap can operate three separate sets of electrical apparatus at the same time. Although primarily designed for use in hospital operating rooms, the new current tap can be used for industrial applications. It has three branch receptacles. All internal wiring is completed at the factory.



Starter Rack

(7) *Square D Co., 4335 Valley Blvd., Los Angeles 32, Calif.*

A new rack for mounting starters in Spin Top enclosures (for hazardous locations) has been developed by this company. The new Spin Top rack provides factory assembled centralized motor control for locations where hazardous material is handled. Besides starters, other equipment including circuit breakers, lighting transformers and panel boards can be mounted. Wiring of all starters and other electrical equipment is provided to a central junction box, and the Spin Top rack is delivered completely wired and assembled.



Splicing Method

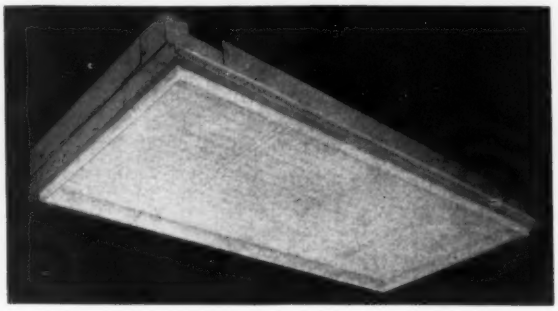
(8) *Fanner Mfg. Co., Electrical Products Division, Brookside Park, Cleveland 9, Ohio*

A new splicing device offered by this company is comprised of a group of helical splicing rods that have been preassembled into handy subassemblies coated internally with special high-friction material. Splices are made of high-grade spring-type alloy wires. No tools are necessary for application. They are designed for use in messenger splicing in open-span applications, or for strengthening damaged conductors.

Bus Drop Cable

(9) *Chester Cable Corp., Chester, N. Y.*

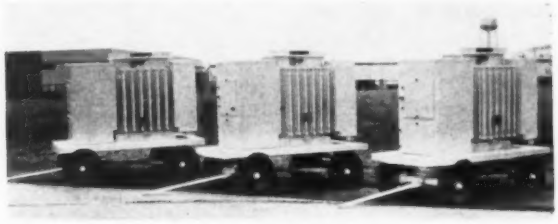
An improved flexible bus drop cable has been produced by this company to provide greater flexibility in the connection of overhead power sources of industrial machine load centers and control boxes. The Plasticote jacket is said to be highly resistant to acids, alkalis, greases, oils, moisture and abrasion. The new cable is available in a range of AWG sizes from No. 14 to No. 2.



Recessed Fixtures

(10) *Holophane Co., Inc., 342 Madison Ave., New York 17, N. Y.*

This company's new fixture is designed for application in stores, offices, showrooms, and for all types of ceilings. Unit installations of continuous luminous runs with no visible metal parts can be made. The basic 4-ft unit consists of two 2x2 injection molded crystal acrylic plastic Controlens with completely concealed reinforced ribs that achieve luminosity over its entire 2-ft width. It is available in two major styles. One has a lens with a shallow dropped edge projecting light to the ceiling, the other a flat lens for unbroken ceiling surfaces.



Mobile Substations

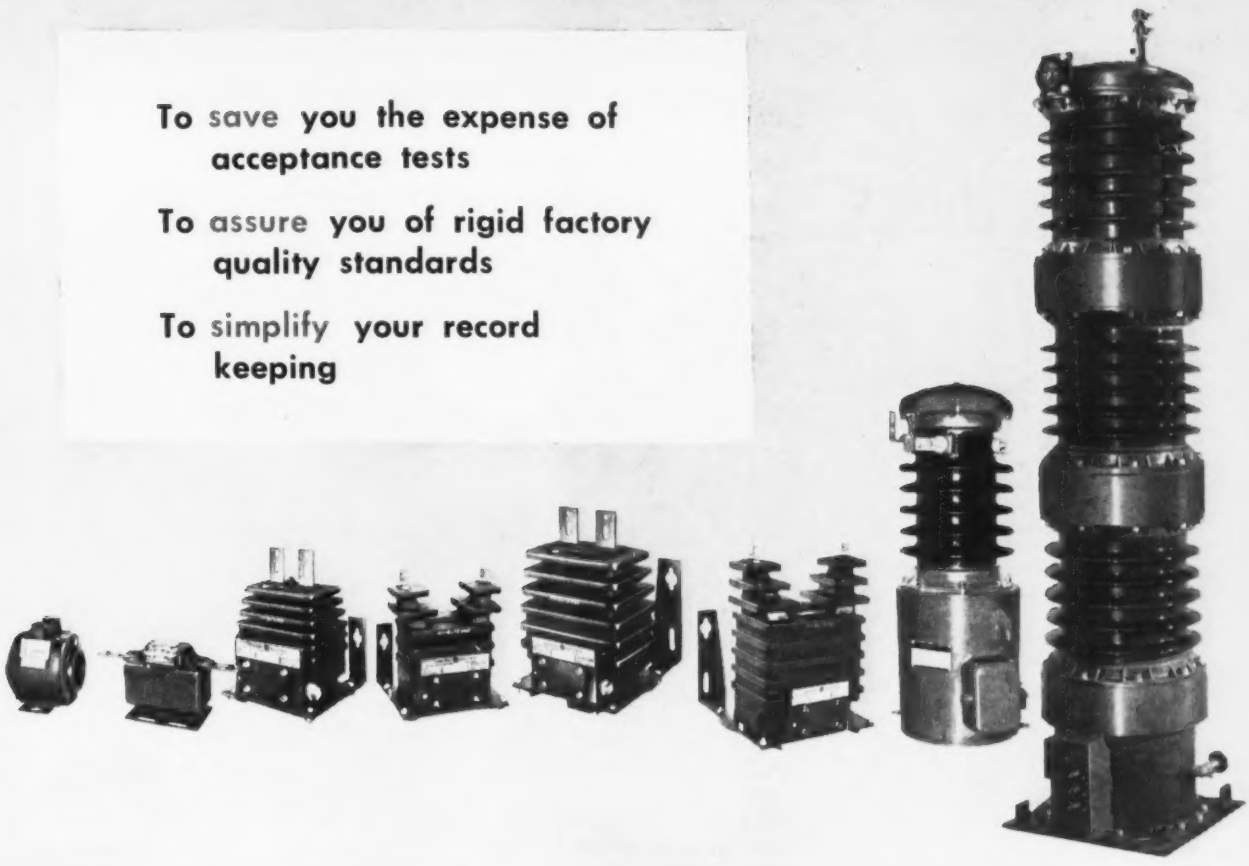
(11) *General Electric Co., Schenectady 5, N. Y.*

Three complete liquid filled unit substations, mounted on steel trailers, have been designed by this company. The units, rated at 300 kva, three-phase, step down incoming power from 2,400 v to a utilization level of 480Y v. They were designed for supplying power to remote areas of a refinery. Incoming line compartments are equipped with a 100-ft reel of armored cable with three insulated snap-on type clamps for connection to primary feeder lines. Each receptacle supplies an external load of up to 50 hp and all eight receptacles are controlled by one main feeder breaker.

To save you the expense of acceptance tests

To assure you of rigid factory quality standards

To simplify your record keeping



Now, from General Electric . . .

Test-certified instrument transformers—600 to 345,000 volts

Effective immediately, General Electric is extending its industry-accepted, test-certification program—which presently covers butyl-molded units—to oil-filled instrument transformers in the voltage ranges 25 kv and higher. A "certification of test" (see below) is now tagged to each oil-filled transformer you buy, certifying that it has passed rigid factory insulation and accuracy tests. Such test-certification—an industry "first" for General Electric—saves you the expense of acceptance tests and assures you of the high-quality standards governing the manufacture of all General Electric instrument transformers.

Your General Electric apparatus salesman has the complete test-certification story. For more information, write General Electric Company, Section 629-2, Schenectady 5, N. Y.

TYPE ES- 9 Company No. .....

Ratio 350/600 : 1 Mfr.'s Serial No. G 9362 53

Insul. Class. 69 KV ASA Accuracy Class- 0.3 W, X, Y, Z

Burden V.A.	Burden P.F.	Sec. Volts	Conn. X or Y	Secondary (X Wdg.) R. C. F.	Secondary (X Wdg.) P. A. E.	Tertiary (Y Wdg.) R. C. F.	Tertiary (Y Wdg.) P. A. E.
0	—	115	1 - 3	.9997	- 1.1	.9997	- 1.1
0	—	115	1 - 3	.9997	- 1.1	.9997	- 1.1
200	1.0	115	1 - 3	1.0008	-3.7	1.0009	-4.1
0	—	67.08	2 - 3	.9998	-0.8	.9998	-0.8
200	1.0	67.08	2 - 3	1.0012	-2.6	1.0013	-3.6

Date 4/30/59 Tested by J. W. T.

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DEPENDABLE
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use
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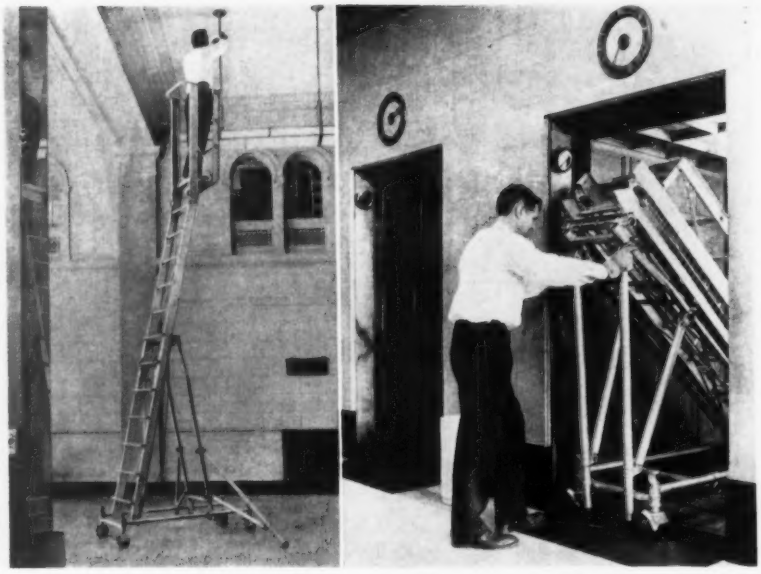
Cleveland 3, Ohio

PATENTED — U.S. PATENT NUMBER 2,761,273



Work Platform

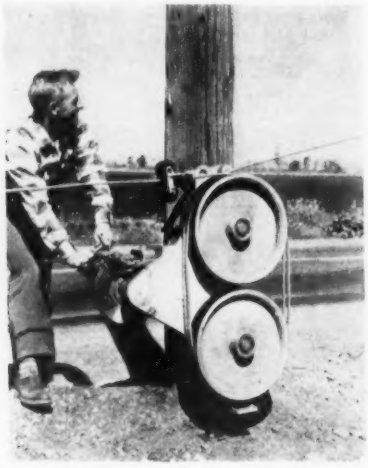
(12) *Up-Right Scaffolds,* 1013 *Pardee St., Berkeley* 10, *Calif.*

A new telescoping work platform for overhead spot maintenance fits inside any normal elevator or storage closet and rolls through doorways. It unfolds into a telescoping platform extendable for reaching heights up to 20 ft. It is made of aluminum, rolls with the job and can be assembled quickly by one man.

Three-Phase Monitor

(13) *Principle Research & Development Corp.,* 200 *Citizens Bldg., Aberdeen, S. D.*

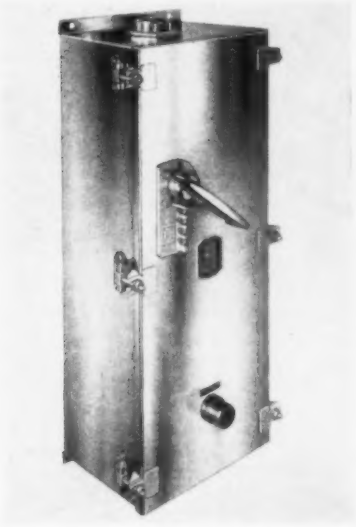
Instantly warning of electrical distribution system trouble, this three-phase monitor gives both visible and audible signals for unbalanced transformer loads, grounds, single phasing and loose connections. The minimum and maximum voltage warning points can be set for each phase. If the voltage drops below these points a phase pilot light goes on and the alarm bell rings. At this time the nature of the difficulty can be quickly determined by reading the three voltmeters and comparing with the illustrated meter chart on the fact of the instrument. The monitor comes with step-down transformers so it can be used on any delta grounded, delta ungrounded or four-wire star systems of any voltage.



Tensioner

(14) *Petersen Engineering Co., Santa Clara, Calif.*

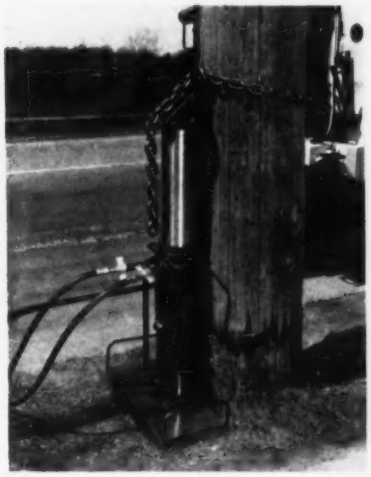
A portable tensioner for distribution work has been developed by this company. It is supported by a power pole, weighs 165 lb and can be used with any size conductor to a bit larger than 4/0. This device is rated for any tension up to 800 lb. line pull.



Starter Enclosures

(15) *Square D Co., 4335 Valley Blvd., Los Angeles 32, Calif.*

Stainless steel enclosures designed to resist the corrosive atmospheres of various industrial plants are now available for Square D combination starters. The enclosures are built to NEMA type 4 specifications. Cover hinge bolts and associated hardware are also stainless steel.



Pole Jack

(16) *Holan Corp., 4100 W. 150th St., Cleveland 35, Ohio*

Operating at a maximum of 1,500 psi, this new pole jack has a lifting capacity of 42,000 lb. The double-acting ram is 6 in. in diameter and

UTILITY BODY OAKLAND

SERIES CC CREW COMPARTMENT BODIES

Utility Body Company's Series CC Line Construction Body provides the ultimate in safety, comfort and warmth for your line crew. This body is unparalleled for its straight line modern design and provides clean and completely protected transportation facilities. Every inch of space is utilized for greater efficiency. Your line crews have absolute assurance that this Body, its compartment layouts, as well as complementary hydraulic derricks and other equipment represent the most effective tools of their nature on the market today.

COMPLETE LINE

The complete Utility Body Line is a sign of progress...matching perfect quality with functional design. With the know-how to meet and fulfill each and every customer's specific requirements...UTILITY BODY COMPANY has engineering and plant capacity to expedite immediate delivery of all special and standard units.

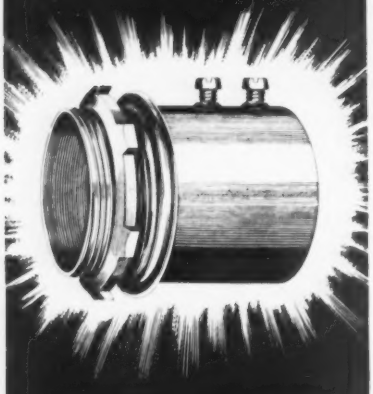
There IS a UTILITY BODY to fulfill YOUR OWN Specific Requirements!!! Contact UTILITY BODY COMPANY for data on the SERIES CC CREW CAB LINE BODIES or telephone your nearest distributor for complete information on UTILITY BODIES.

MODEL UED-2 DERRICK 26' to 30' 6" HEIGHT

MODEL CC-147C BODY

UTILITY BODY CO.
1530 WOOD STREET
OAKLAND 7, CALIFORNIA
TWinoaks 3-8980

NOW...all ETP fittings are Chromate Plated FOR LASTING PERMANENCE!



...AT NO INCREASE IN PRICE!

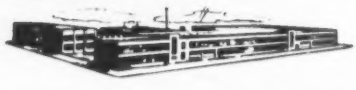
Concrete tight! Every size connector and coupling up to 2". Why settle for ordinary fittings when ETP gives you all this:

- New sparkling Zinc Chromate overplating for lasting permanence. Salt spray tested to retard corrosion.
- Exclusive pre-set, deep-slotted STAKED screws. No backing out for conduit.
- Concrete tight with heaviest gauge wall thickness. U.L. file card E24788.
- Precision bevelled edges with extra heavy duty locknut.
- One piece solid tubular steel—cannot open or spread. Sized for uniformity.
- Available in ½", ¾", 1", 1¼" (one screw type) and 1½" and 2" (two screw type)

CONNECT WITH ETP FOR ECONOMY

WEST COAST REPRESENTATIVES:
WEINGART & LUSTIG
1567 E. 25th Street Los Angeles 11, Calif.
ADams 3-4111

ETP



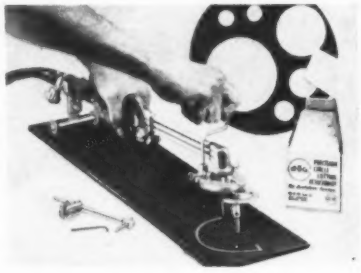
ELECTRIC TUBE PRODUCTS
74-16 Grand Avenue, Maspeth (N.Y.C.), N. Y.

has an 18-in. stroke. Two 15-ft hose lengths are supplied with the unit and additional lengths are available. Oil pressure is controlled by a four-way valve mounted on the truck. The base is detachable.

Capacitor Control

(17) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

Enclosed in a Flexitest case, this new control for capacitor switching contains an improved master induction disc relay that has a dual range of adjustment from ½ to 1 amp and from 1 to 4 amp. In addition, a var relay is used for the first time. Two thermal plug-in-type fixed time-delay relays, one in the close circuit and one in the trip circuit, provide a predetermined time delay that eliminates unwanted switching operations from rapid system fluctuations of short duration. The fixed time-delay relays are in the circuit only during automatic operation.



Cutting Tool

(18) *Ideas Inc., 214 Ivinson Ave., Laramie, Wyo.*

A tool for cutting precision holes and various shapes in thick metal plate is available from this company. Developed for use by the U. S. Navy, the tool attaches to any acetylene cutting torch for cutting holes through metal walls and decks for pipe and conduit.

Floodlight Poles

(19) *Weld-Rite Co., 4417 Oakport, Oakland, Calif.*

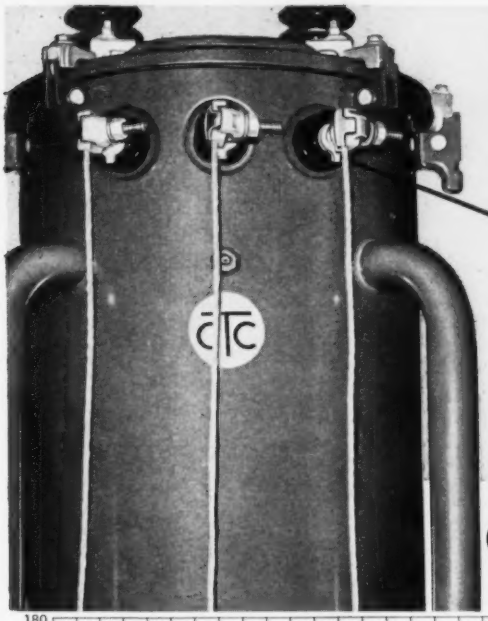
This company is manufacturing floodlighting poles for Candlestick Point Stadium in San Francisco to be used for stadium floodlighting. The poles are 195 ft, 155 and 130 ft high and will carry 1,125-1,500-w floodlights. The lighting will maintain at 150 f-c in the infield and 100 f-c in the outfield.

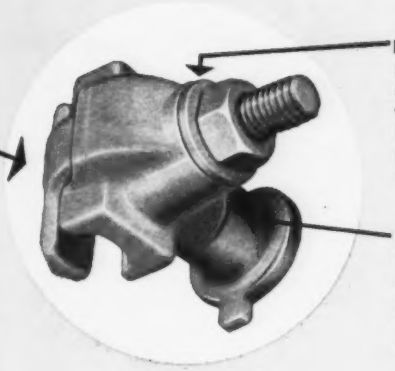
Pole Setter

(20) *Calavar Corp., 2700 S. Broadway, Los Angeles 7, Calif.*

A new earth-boring machine and pole setter designed to handle 100-ft class A poles is announced by this company. A hydraulic derrick is mounted on a specially engineered FWD 326 4x4 chassis and uses a heavy-duty International boring machine. It has a capacity of 12,000 lb jacks-down and 10,000 lb jacks-up, with a sheave height of 40 ft, extended 5 ft to the rear of the chassis. Four cylinders control the boom. The derrick can be cab or rear-end controlled to meet any operating requirement.

For more information fill in coupon . . . p 24

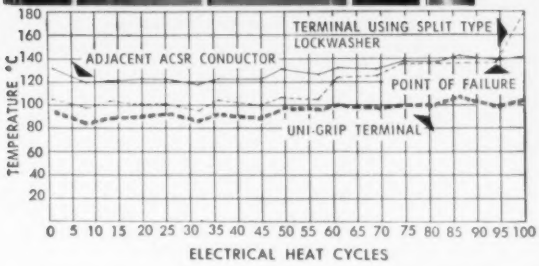


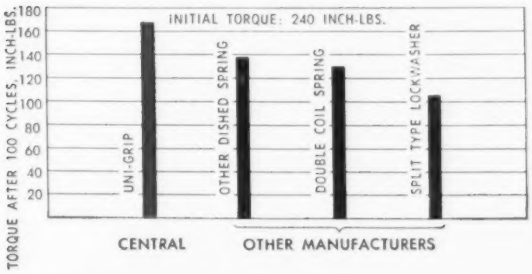


EXCLUSIVE! High carbon steel dished washer of special design, zincplated with chromate conversion. Maintains pressure, compensating for aluminum conductor "cold flow".

Flowed tin plating on bronze body and eyebolt assures maximum compatibility corrosion-wise with either aluminum or copper conductors.

Central's New "UNI-GRIP" Transformer Terminal Solves Your Aluminum Clamping Problems!





HEAT CYCLING AND TORQUE TESTS PROVE SUPERIOR PERFORMANCE OF CENTRAL'S NEW TERMINAL FOR USE WITH BOTH COPPER AND ALUMINUM CONDUCTORS!

Central's revolutionary new universal terminal—"UNI-GRIP"—represents the most outstanding advancement to date in solving the problems of clamping aluminum conductor.

Its superior performance over other types of terminals has been established by extensive heat cycling and torque tests.

"UNI-GRIP" combines a new spring washer, flowed tin plating and increased contact area.

Central's new terminal was designed and perfected by Anderson Electric Corporation, Birmingham, Alabama, in cooperation with Central engineers.

PLUS . . . ALL STANDARD FEATURES

- Components are quality-control-tested by ASTM's Mercurous Nitrate Specification B154-51 to insure against stress corrosion cracking, and season cracking.
- Connector contact design configuration correct to prevent separation of conductor strands.
- Contact surface areas sufficiently large and smooth to prevent damage to conductor under pressure.
- Eye-Bolt entrance rounded to prevent cable damage.
- Bushing, terminal and transformer tank interlocked to prevent turning.

Just one more reason why Central Transformers are **PREFERRED** *throughout the Nation*

CENTRAL CTC

Sales Offices in Principal Cities
Transformer Corporation
Telephone JEfferson 4-5332
PINE BLUFF, ARKANSAS

NEMA

For phone number of closest representative see advertising index in back of book.

BULLETINS ETC.

(21) **CONDUIT FITTINGS**—A new handbook and catalog of Spang conduit and fittings has been issued by National Supply Co., 2 Gateway Center, Pittsburgh 22, Pa. Ask for bulletin No. 485. The technical section carries the latest American Standards Assn. specifications for various types of conduit and electrical metallic tubing.

(22) **UNIT SUBSTATIONS**—Publication GEA—3800D of General Electric Co., Schenectady 5, N. Y., describes the effective use of the company's master unit substations in handling the protective, transformation and switching problems in both industrial and utility power distribution systems. Subjects discussed include system reliability, substation flexibility, engineering, unified billing and responsibility, space requirements, and other pertinent information.

(23) **ALUMOWELD**—Technical information on Alumoweld, a newly developed aluminum covered steel wire and strand, is contained in a 12-page catalog available from the Wire & Cable Div., Copperweld Steel Co., Frick Bldg., Pittsburgh 19, Pa. Ask for catalog E.D. 3000.

(24) **SPLICING**—A new pocket-size application procedure booklet containing instructions for the installation of Preformed Splices on messenger strands, guy strands, ground wires, and open line wires is now available from Preformed Line Products Co., 5349 St. Clair Ave., Cleveland 3, Ohio.

(25) **ELECTRICAL CONNECTORS**—Crouse-Hinds Co., Syracuse 1, N. Y., is offering a 48-page bulletin describing a complete new line of plugs and receptacles in environment resistant construction. Ask for bulletin 2711.

(26) **ALUMINUM CONDUCTORS**—A new publication, "Current-Temperature Characteristics of Aluminum Conductors," gives the latest available information on the current-temperature characteristics of both ACSR and stranded aluminum conductor. Write Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

(27) **PHASE FAILURE RELAYS**—Bulletin 230, available from Stradley Engineering Co., Box 6006, Pittsburgh 11, Pa., describes the company's 230-v phase failure relay. With the addition of potential transformers the relay can be used for either 115 or 460-v inputs.

(28) **UNIT SUBSTATIONS**—Complete information describing 'Tranfo-Units' unit substation is furnished in a new bulletin published by ITE Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa. Ask for bulletin R-5604-1A.

(29) **COOLING TOWERS**—Information on a complete line of packaged cooling towers with self-clearing basins is available in bulletin 53-902 from J. F. Pritchard & Co., 4625 Roanoke Parkway, Kansas City 12, Mo. The units are horizontal, induced draft steel cooling towers, two tons to 120 tons in capacity.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after August 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Here are the Graybar Offices in the West

ARIZONA

Phoenix:	1700 North 22nd Ave. ALPINE 2-2371
Tucson:	212 South Park Ave. TUCSON 2-6439

CALIFORNIA

Fresno:	101 Van Ness Ave. ADAMS 7-4175
Long Beach:	800 West 16th St. HEMLOCK 2-2911
Los Angeles:	210 Anderson St. ANGELUS 3-7282
Oakland:	1911 Union St. GLENCOURT 1-5451
Oceanside:	805 N. Tremont St. SARATOGA 2-2141
Sacramento:	1900 — 14th St. GILBERT 2-8976
San Bernardino:	655 South "H" St. TURNER 9-1051
San Diego:	720 State St. BELMONT 3-1361
San Jose:	1376 N. Tenth St.
San Francisco:	1750 Alameda St. MARKET 1-5131
Santa Ana:	301 French St. KIMBERLY 3-8309
Van Nuys:	15520 Cabrito Road STATE 2-9600

COLORADO

Colorado Springs:	630 West Vermijo Ave. MELROSE 4-3701
Denver:	104 Wazee Market TABOR 5-7111

IDAHO

Boise:	1325 Idaho St. BOISE 2-4501

MONTANA

Butte:	604 E. Aluminum St. BUTTE 3233

OREGON

Eugene:	2580 West Broadway DIAMOND 4-2224
Portland:	Park & Flanders Sts. CAPITOL 7-6641

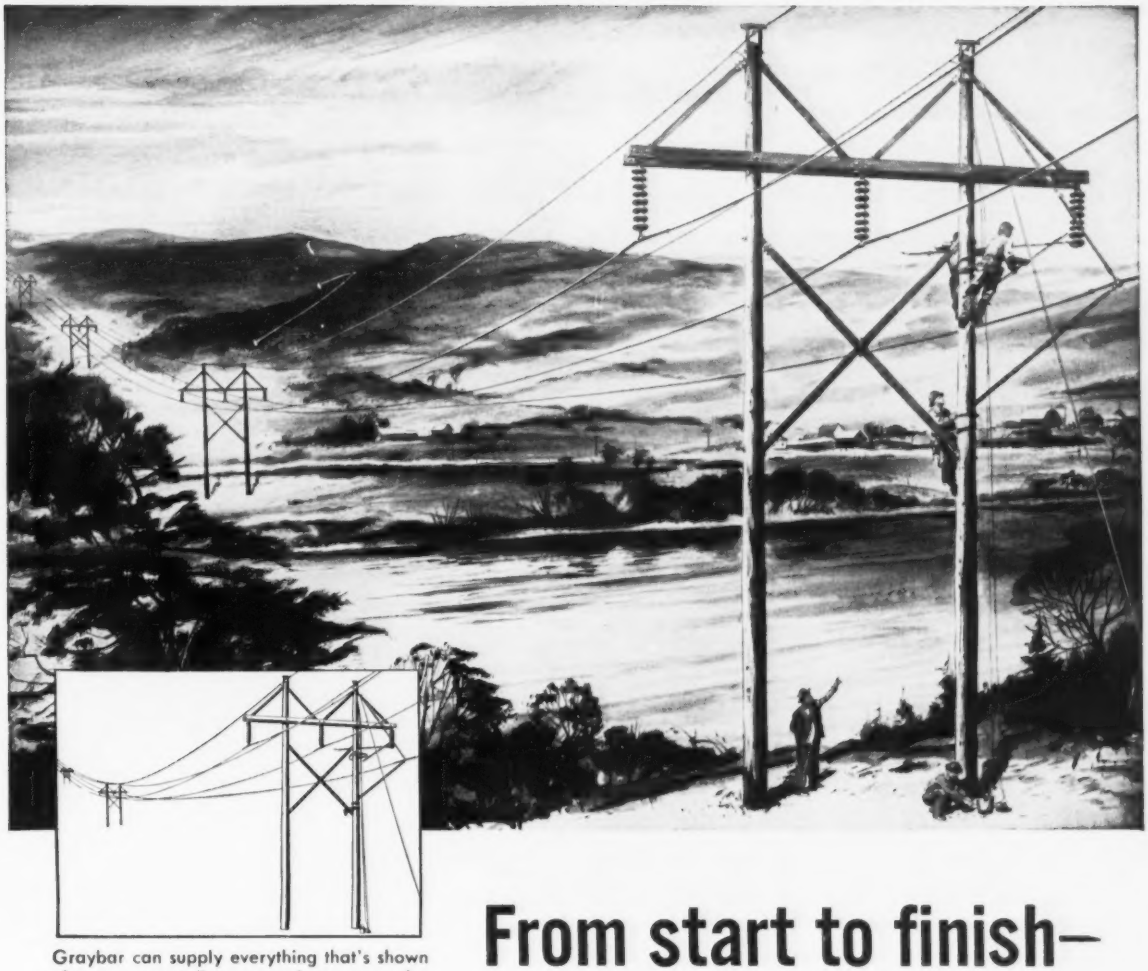
UTAH

Salt Lake City:	336 North Third West St. ELGIN 9-8771

WASHINGTON

Seattle:	King & Occidental Sts. MUTUAL 2-0123
Spokane:	West 1033 Gardner Ave. FAIRFAX 7-6611
Tacoma:	2112 "A" St. MARKET 0164

FOR IMMEDIATE SERVICE ON EVERYTHING ELECTRICAL CALL THE OFFICE NEAREST YOU



Graybar can supply everything that's shown above — except linemen and scenery — for line construction and maintenance. Poles, crossarms, hardware, tools—a partial list of items that are stocked at strategic Graybar locations throughout the country. All available for fast delivery to you. It pays to call Graybar . . . first.

From start to finish—
arrange for continuing supplies and equipment—with Graybar

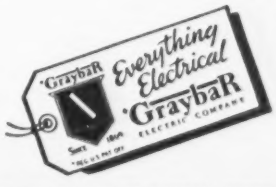
Engineers deep in the problems of new transmission *line construction* must be able to depend upon reliable, on-time deliveries to keep their schedules. And later, to meet the continuing task of *line maintenance*, the selection, dependable delivery and warehousing of supplies and equipment are vital.

Graybar backs up design and construction engineers to speed up these processes. Through more than 130 offices and warehouses, Graybar supplies prompt catalog information on everything electrical needed in line construction and maintenance.

To speed up the selection and delivery of anything and everything you need for line construction and maintenance call Graybar first. *Graybar Electric Company, 420 Lexington Avenue, New York 17, N. Y.*

713

CALL GraybaR FIRST FOR



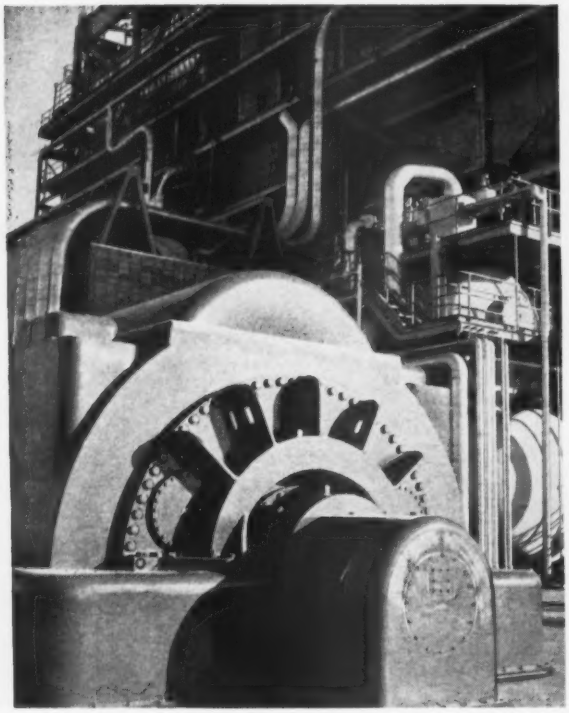
GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES

STANDARD ENGINEER'S FIELD REPORT

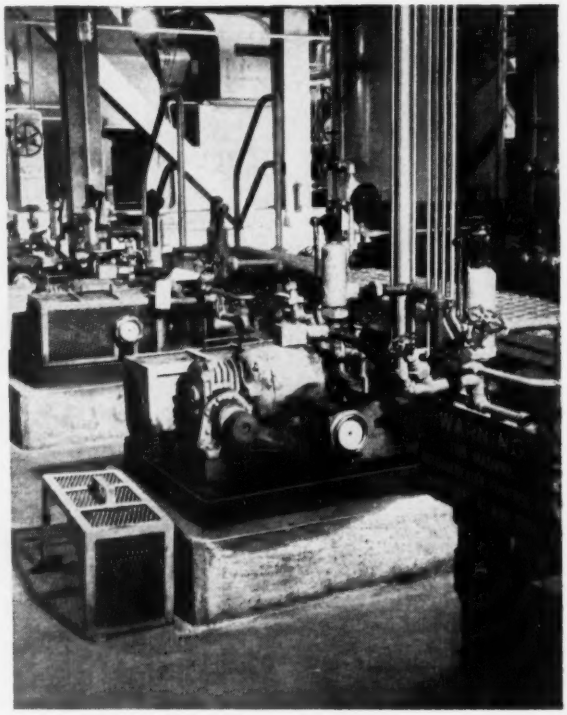
PRODUCT **Chevron Industrial Grease**

FIRM **Alamitos Steam Station Southern California Edison Co.**

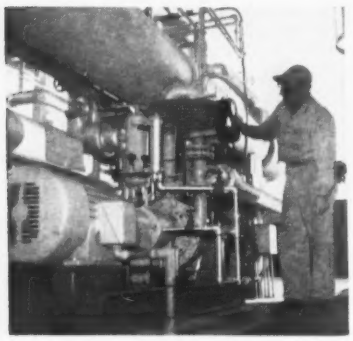
Chevron Grease replaces four at Alamitos Station

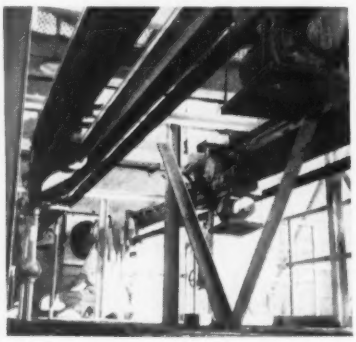


Instead of 4 different greases frequently used in large steam generating plants, Southern California Edison Company's up-to-the-minute, 350,000 KW Alamitos Steam Station (above) meets all its needs with versatile Chevron Industrial Grease.



Rust protection of Chevron Industrial Grease and its unusual water resistance make it ideal for lubricating bearings of chemical feed pumps and their motors (above). Pumps feed Hydrazine to condition boiler water before it enters tubes.





Maintenance is simpler and there's no chance of error using same lubricant for sump pumps (left), boiler cleaning lances (right) and all other greased equipment. Firm selected Chevron Industrial Grease for Alamitos as a result of several years satisfactory performance at their Terminal Island Station.

Why Chevron Industrial Grease provides Superior Lubrication

- Top wear-prevention qualities
- Unusual water resistance
- Rust protection
- Non-corrosive
- Mixes with any grease
- High work stability
- Melting point, 500°F. plus
- Pumpable over wide temperature range

For More Information on this product contact your Standard Engineer or Representative or write 225 Bush St., San Francisco 20, Calif.

CHEVRON Industrial Lubricants

TRADEMARK "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

Look to HAPCO...*for Modern Styling, Permanence and Economy*

Virginia's 35-mile Richmond-Petersburg Turnpike is another outstanding example of the many streets and highways from coast to coast that depend on HAPCO poles and brackets to help brighten the way for safer night driving.

HAPCO Aluminum Standards offer a new concept in modern styling, permanence and economy in lighting standard design that has made them especially desirable for use wherever outdoor lighting is needed.

For complete information on Lighting Standards and Brackets ask for the new HAPCO Catalog HAL 259. Write to Hubbard Aluminum Products Co., 6301 Butler St., Pittsburgh 1, Pa.

HUBBARD

ALUMINUM PRODUCTS COMPANY
DIVISION OF HUBBARD AND COMPANY

For phone number of closest representative see advertising index in back of book.

RT&E Terra-Trau

Area developer, by previous agreement with the utility, does trenching and pouring of concrete at his expense. Utility and developer cooperate in establishing final grade, so that uniform cable depth can be maintained.

Conduit bends for primary cable are positioned at transformer site. After ducts for both primary and secondary cable are laid, the trench at pad location is back-filled, and loose earth is tamped.

SHOW HOW ONE LEADING

When homes are ready for service, transformer is brought to pad location and bolted to the pad by means of the studs set in the concrete.

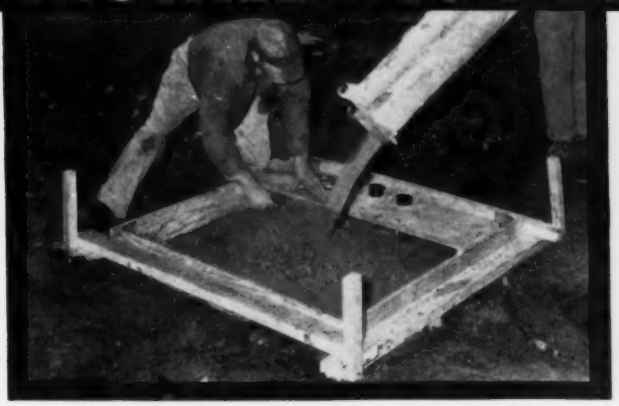
Stress relief cones are formed at primary cable terminations. Connections to transformer bushings are made by means of hot line clamps designed for either hand or hot stick operation.

UNDERGROUND DISTRIBUTION

Terra-Trau ready for service. All that remains to be done is the connection of customer-owned secondary and final landscaping, to be completed as shown in this illustration.

For phone number of closest representative see advertising index in back of book.

INSTALLATION PHOTOGRAPHS



Wooden form for transformer pad is constructed at transformer site and concrete is poured. Both of these jobs are the responsibility of the area developer.

Direct burial primary and secondary cable is laid in trench and terminations brought out at transformer site.

UTILITY HOLDS DOWN

Lineman demonstrates method of removing or inserting bayonet-type high voltage fuse or disconnect switch that is used when energizing or de-energizing the Terra-Tran.

Secondary connections are made to complete the installation. Terra-Tran's green finish blends in with surroundings.

SYSTEM COSTS

RT&E

ENGINEERING TALENT CONCENTRATED ON ONE IDEA
A BETTER TRANSFORMER

CORPORATION
WAUKESHA, WISCONSIN
PORTLAND, OREGON

DD

here's the inside story on Southern States cutouts and boric acid fuse links

While Southern States Distribution Cutouts are designed to function properly with other makes of fuse links, there is a measurable difference in performance when Southern States boric acid links are used—not only in our cutouts, but in other makes, too.

The cutaway view tells the inside story of why Southern States Cutouts and Fuse Links work together to provide the ultimate in fuse protection.

The auxiliary tube of the link is unusually long and sealed to the top ferrule. The fusible element is buried in boric acid powder.

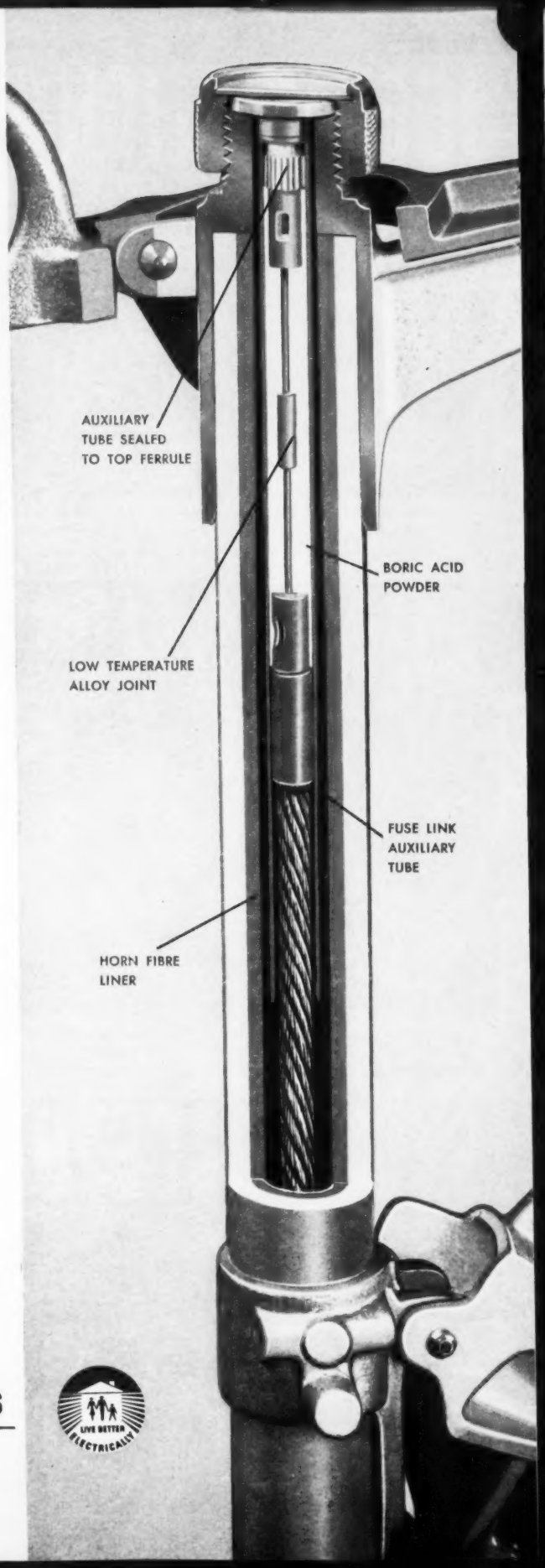
When a fault occurs, even one just sufficient to melt the fusible element, a lot of things happen fast: First, an arc is established when the element separates. The heat generated by the arc instantly converts the boric acid powder into water and then into a large volume of steam. This action performs a dual task. First, vaporization of the water and rapid expansion of gas cools the arc. Simultaneously the arc stream is purged of ionized gas by a fast-moving column of steam.

Circuit interruption is swift and sure.

At higher values of fault current, pressures generated destroy the auxiliary tube. When this happens, the main tube takes over, normally clearing the fault in less than a cycle.

For the ultimate in fuse protection on low or high faults, use Southern States Cutouts and Fuse Links.

Get full information from your Southern States representative, or write for Bulletins 58OC and 55PD1.


AUXILIARY TUBE SEALED TO TOP FERRULE
BORIC ACID POWDER
LOW TEMPERATURE ALLOY JOINT
FUSE LINK AUXILIARY TUBE
HORN FIBRE LINER

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA Dominion Cutout Co., Ltd., Toronto

LIVE BETTER ELECTRICALLY

NEW... by CROUSE/HINDS

ARK-trol®

ELECTRICAL CONNECTORS

• Foolproof polarization • Errorless assembly • Maximum interchangeability • Environmental: Exceed rigid military and industrial requirements for resistance to corrosion, chemicals, high and low temperatures, pressure, shock, vibration, dust, humidity, moisture, and leakage of air.

POSITIVE POLARIZATION

Completely foolproof: plug can be mated only with proper receptacle, and in only one way . . . the *right* way. Unsymmetrical contact arrangements preclude improper mating of contacts, or mating of unmatched contact configurations.

FAST, EASY, ERROR-FREE ASSEMBLY

Polarization keyways and unsymmetrical contact arrangement in insert assemblies make improper assembly of parts impossible. One-piece 'snap-in' connectors. Soldering is done outside . . . *before* insertion of contacts.

SEALED AGAINST ENVIRONMENTAL FACTORS

'Stack' assembly includes silicone rubber wafer for impenetrable seal against water, vapors, dust, gas. Basic shells, other metal parts are high-strength extrusions of aluminum alloy, anodized for corrosion, abrasion resistance: 1800 volts are required to penetrate this coating.

MAXIMUM INTERCHANGEABILITY

Components in each diameter are interchangeable and reversible, doubling scope of equipment. Male *and* female shells take either pin or socket inserts: both plug and receptacle may be used 'hot' or 'dead'. Pin and socket configurations available in wide range . . . specials supplied on request.

SHELL SIZES and ELECTRICAL RATINGS

Four shell sizes: from 1-1/16" to 2-9/16" diam. *Voltages:* Military Service Ratings: A, D, E, B, C and Instrument. NEC Rating: 600V. A.C. *Contact sizes:* #16 to #4/0 inclusive. Write for Bulletin 2711 containing complete descriptions, specifications and configuration patterns for both Type RPE and RPC *ARK-trol* Electrical Connectors.

Available in two types:

TYPE RPE ENVIRONMENTAL
- Moisture Proof
- Shock Insulated
- Dust-Tight
- Corrosion Resistant
- Grounded & Non-Grounded

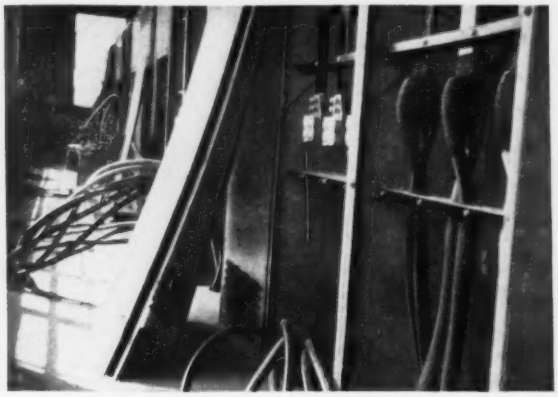
TYPE RPC CIRCUIT BREAKING
- All Features of RPE *Plus* . . .
- Circuit Breaking under full Rated Load

CROUSE HINDS SYRACUSE NEW YORK

OFFICES: Atlanta Baton Rouge Birmingham Boston Buffalo Charlotte Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Omaha Philadelphia Pittsburgh Portland, Ore. St. Louis St. Paul Salt Lake City San Francisco Seattle Tulsa Washington
RESIDENT REPRESENTATIVES: Albany Baltimore Reading, Pa. Richmond, Va.
CROUSE-HINDS COMPANY OF CANADA, LTD., TORONTO, ONT. CROUSE-HINDS INSTRUMENT COMPANY, INC., SILVER SPRING, MARYLAND

Installed in underground ducts, Paranite Super Pararite-Paraprene® network cable services a modern electronic computor installation.

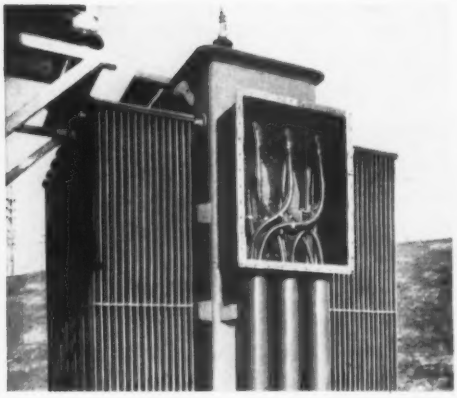
Paranite Super Pararite-Parasyn cables carry primary power between transformers and switchgear control panels in an ore reduction plant.



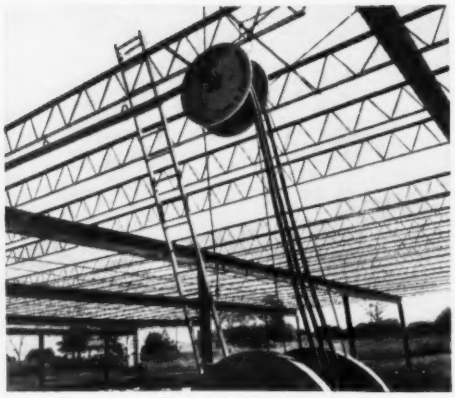
Across the nation for trouble-free installations...

PARANITE®

"IF IT'S PARANITE IT'S RIGHT"®



Paranite Super Pararite-Paraprene cable serves as the primary transformer feeder in a new municipal water pumping station.



Overhead duct installation of Paranite Super Pararite-Parasyn® (PVC) serves as a secondary feeder cable in a manufacturing plant.

The consistent selection and performance of Paranite cables from 600 volt network through 23,000 volt power cables mark them as products of close quality control. These Super Pararite-Paraprene and Super Pararite-Parasyn (PVC) cables illustrated above, indicate the versatility, national availability and proven trouble-free performance of Paranite installations.

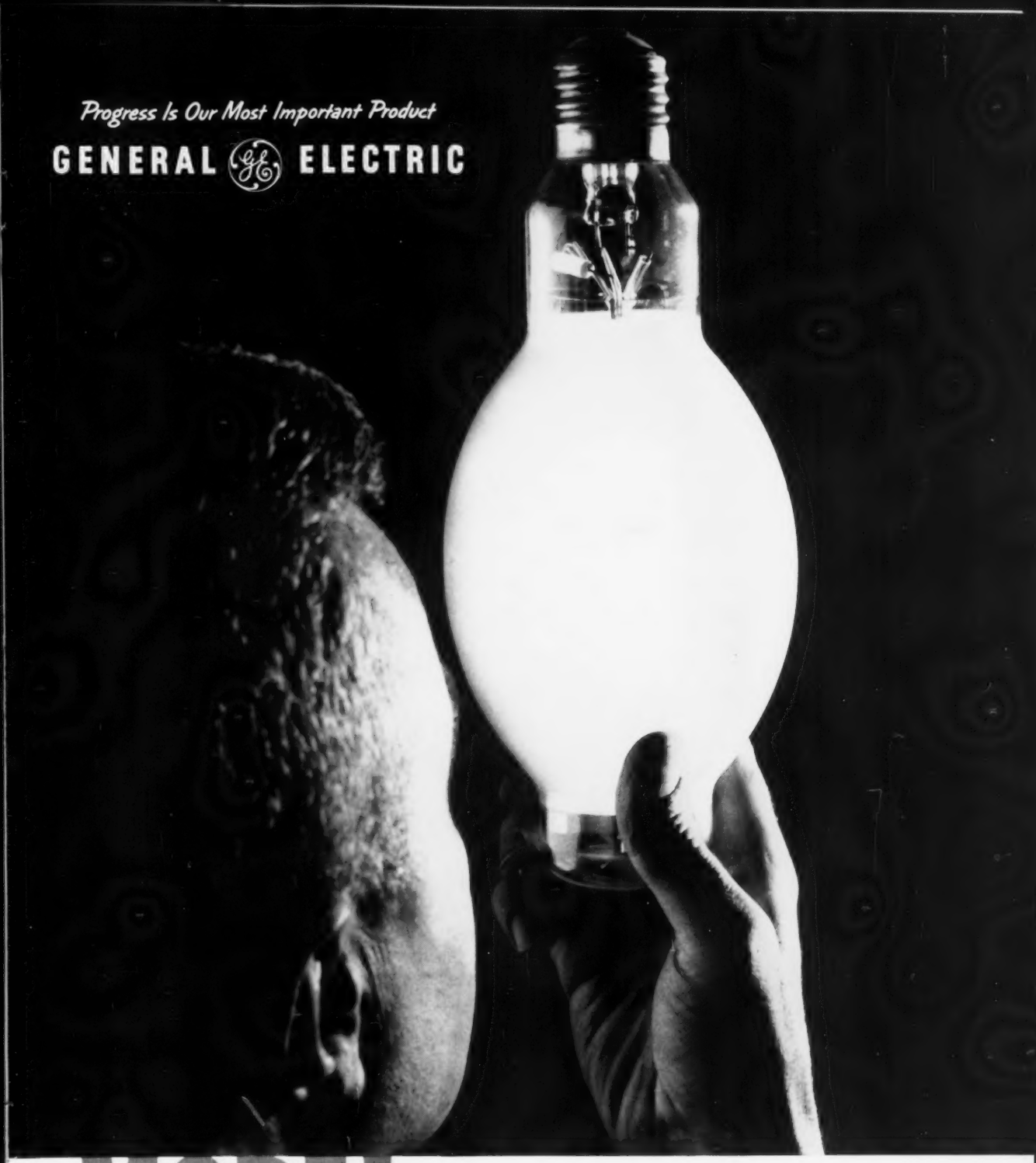
PARANITE WIRE AND CABLE DIVISION

Essex Wire Corporation, Fort Wayne, Indiana

MANUFACTURING PLANTS: Marion, Ind.; Jonesboro, Ind.; Tiffin, Ohio; Birmingham, Ala.; Anaheim, Calif. • Sales Offices in All Principal Cities

Progress Is Our Most Important Product

GENERAL ELECTRIC



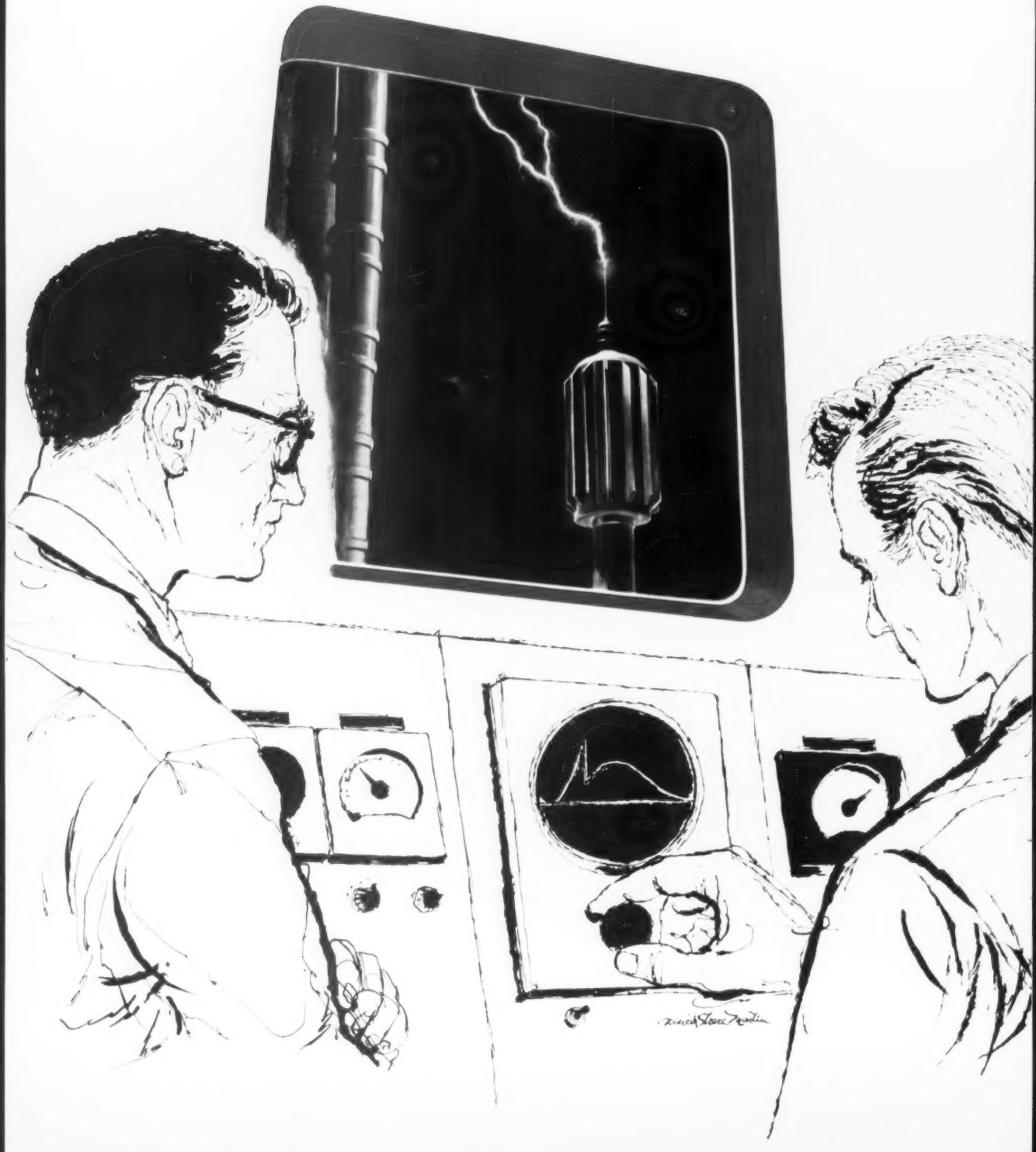
MORE!

"Even in the middle of summer, *everybody's* happy when *this* mercury goes up. It's a General Electric Mercury Lamp . . . and when it goes up in a socket, our customers' lighting levels, employee morale and production figures go up, too. But their cost of light drops like a barometer in an approaching storm.

"General Electric Mercury Lamps, *at any given time in their life, will outperform other brands the same age.* What's more, they're built to last as long or longer than any other. It figures . . . after all, G. E. is first in mercury . . . just as they are in fluorescent and filament lamps. So, I'll keep telling my customers to stick with the leader."

General Electric Co., Large Lamp Dept. C-923, Nela Park, Cleveland 12, Ohio

Before you buy another



transformer... EVALUATE INNOVATIONS

6% of General Electric's distribution-transformer sales goes to improve the product and reduce costs to you

Research in distribution transformers is a catalyst which speeds the normal rate of developments. To make innovations fast enough to keep pace with the unprecedented growth forecast for utilities, General Electric invests over three times as much, per sales dollar, as the average for all industry.

G.E.'s development of production line impulse testing, for example, resulted in drastic reduction in transformer field failure rate. And development of grain-oriented core steel has saved utilities over $300 million. New additions are Permalex* insulation, providing up to 20% more overload capacity, and Melalast* cover finish which cuts service outages.

Other G-E innovations include: Strenicor clamps and bushings for copper or aluminum conductors. The return to you: a more durable and economical transformer to meet your system needs.

Before you buy another distribution transformer, evaluate innovations—give your transformer manufacturer credit for the extra values he gives you. G.E. Co., Schenectady, N. Y.

* Trademark of G.E. Company. 431-80

Progress Is Our Most Important Product

GENERAL ELECTRIC

GIVE YOUR TRANSFORMER MANUFACTURER CREDIT FOR THE EXTRA VALUES HE GIVES YOU

		G.E.	OTHER MFRS.			
MEASURE LOAD BUILDING—do Co.'s other products build load? Does Co. sponsor load-building programs?						
CHECK SERVICE—24-hour shipment? repair and uprating? emergency assistance?						
COMPARE FEATURES—how many exclusive features in terms of longer life; reliability; easy maintenance?						
ANALYZE PRICE—does Co. hold line against inflation with significant product developments?						
EVALUATE INNOVATIONS—has Co.'s research paid off for you? Recent examples?						

FILL IN THE BLANKS . . . See which manufacturer gives you more for your transformer dollar: Mark "X" for a measurable contribution, "O" for insignificant contribution.

NELPA

SERVING THE ELECTRICAL INDUSTRY FOR OVER 50 YEARS

OFFERS THE OPPORTUNITY TO THINK—PLAN—WORK TOGETHER

Electric Utility Companies, Electrical Manufacturers, Distributors, Contractors, Retailers and Service Companies join membership in NELPA to carry on activities which in part consist of:

* Workshop Conferences
  1. Engineering & Operation
  2. Business Development
  3. Personnel & Safety
  4. Accounting
* Serving As A Voice For Tax Paying Electric Utility Companies That Serve Over 2,850,000 Customers In The Northwest.
* Conducting Industry Surveys.
* Clearing House For Information.
* Promoting The Progress Of The Electrical Industry So That The Public May Be Better Served. (Object Of NELPA)

The Investor Owned Utility Members of the Association provided an additional 12,000 construction jobs for the second consecutive year in 1958 as a record $325,000,000 of private money was being spent.

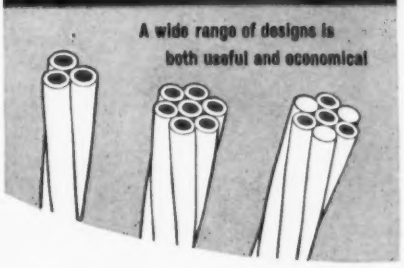
951,000 kw of electric energy was dumped into the Northwest Power Pool during 1958 by NELPA's utility members.

Associations Accomplish Those Things Which Most People Think Just Happen

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

204 CORBETT BUILDING • PORTLAND, OREGON

Now...a NEW overhead ground wire



ALUMOWELD T.M.

Aluminum-Covered Steel Wire

Exclusive features—

a **thick cladding** of aluminum
a controlled **atomic weld**

Give your transmission lines permanent protection with the new light-weight, low-cost Alumoweld Overhead Ground Wire—the only aluminum-covered steel wire with a thick cladding of aluminum and the only one made by the controlled atomic-weld process.

Not only does Alumoweld have the strength of steel wire, but because of its 25% by area aluminum covering, it offers the added advantages of much higher conductivity and far greater service life. In fact, Alumoweld has corrosion resistance equal to solid aluminum wire, has one third the conductance, and eight times the strength.

In Alumoweld Overhead Ground Wire, you get three important benefits. (1) Its thick aluminum covering permanently protects the high-strength steel core against corrosion. (2) The electrical conductance is excellent for relaying and for discharging lightning and transient currents to ground. And, (3) Alumoweld's high strength permits stringing for ample mid-span clearance.

For more information on Alumoweld, write today for Engineering Bulletin E.D. 3000.

ALUMOWELD

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION Glassport, Pa.

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

For phone number of closest representative see advertising index in back of book.

Let's tackle our problems NOW!

THE PCEA IS A WORKING ORGANIZATION . . . its members are hammering out practical answers to the problems facing our growing industry in dozens of meetings throughout the year.

PROBLEMS ARE CHALLENGES . . . nowhere more critical than in the well-integrated electrical industry, where utilities and manufacturers, contractors and wholesalers count on each member of the electrical team to pull together so that the West's development will not fall short for want of kwh and the goods which generate, transport and consume them.

PROBLEMS ARE OPPORTUNITIES . . . equal to the challenges and responsibilities . . . larger and more profitable loads for utilities . . . bigger markets for manufacturers and wholesalers . . . more jobs for contractors . . . more customers for everyone.

A NEED TO WORK TOGETHER . . . to understand the common problems and to share the common opportunities the electrical industry in the West more than ever before needs to "work with itself" in its own committee meetings and forums.

PCEA STRENGTH . . . is in the enthusiasm and energy of its individual members . . . thanks to them and their day-in and day-out efforts, this Association "gets things done that people think just happen".

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street
Los Angeles 14

681 Market Street
San Francisco 5

Your Linemen will prefer "PRESS-ON"

Faster, easier two-handed installation

1 SLIP INTO DIE with tap wire in "Press-On"
2 HOOK OVER THE RUN; no tab to bend
3 CRIMP with your present tools—Hand or Hydraulic
"PRESS-ON" CONNECTOR
Patent Pending

Complete Wrap-Around of each conductor in a solid metal wall—with a *lap joint* on the run—keeps out corrosion.

Built-in Solid Aluminum Separator prevents strand cutting; minimizes cold flow in aluminum to aluminum or corrosion in aluminum to copper.

and for your Engineers .....

Made of pure aluminum, factory treated and filled with "Cual-Aid" oxide inhibitor, and individually wrapped. 23 sizes from No. 6 sol. to 4/0 ACSR. **Crimped with your present tools,** using dies and grooves you now have, or Penn-Union dies.

Write for Samples—test this faster, safer, more dependable compression tap, "Press-On." PENN-UNION ELECTRIC CORP., Erie, Pa. *30th Year of Service to the Electrical Industry.*

There's a NEW and BETTER way at PENN-UNION

For phone number of closest representative see advertising index in back of book.

NEW!

ROME *TRIMLINE** PRIMARY DISTRIBUTION SYSTEM

WITH A NEW SIMPLIFIED, STREAMLINED SPACER DESIGN!

A Practical Overhead System. Developed for utility and industrial distribution circuits ranging from 5 to 15 kv, Rome's TRIMLINE* system consists of (1) a unique and highly simplified Plexiglas supporting spacer, (2) extruded black, high molecular weight polyethylene insulated phase conductors (either one, two, or three phase), and (3) a high strength supporting messenger.

This economical method of overhead distribution is recommended for installations where:

- additional circuits are required on a pole
- poles are too crowded
- bad tree and storm conditions cause havoc with open-wire lines
- alleyways prohibit use of crossarms

. . . and especially where a *compact* and *neat-appearing* distribution system is necessary!

System Features New Spacer. Now . . . a new spacer design makes Rome's TRIMLINE* system as reliable as it is practical. The one-piece Plexiglas spacer offers distinct "reliability" features. It has no mating or matching surfaces to form cracks or crevices which collect water or other contaminants. This in turn reduces the possibility of eventual arcing or shorting.

Each spacer is equipped with four "snap-lok" neoprene grommets (adapters). Special molded-in compression rings in each grommet assure a snug spacer-to-cable fit. The constant pressure exerted upon the messenger and conductors restricts the spacer from "traveling" on the line.

The spacer itself is shaped like a diamond with rounded corners and smooth edges. When installed, each of the phase conductors and the messenger are completely contained within the encompassing spacer unit.

Installation of the spacer unit is performed with no tools or special equipment, requires *no* nuts or bolts. And maintenance is just as easy—phase conductors can be removed or added without removing the spacer from the messenger. Spacers are placed approximately thirty feet apart along the entire length of the distribution system.

*T. M. (patent applied for)

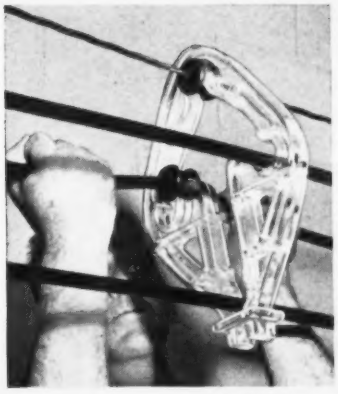
HERE'S WHAT THE TRIMLINE SYSTEM OFFERS YOU:

1. A *single* spacer for 5 to 15 kv range.
2. Abrasion-resistant high molecular weight polyethylene insulation or other suitable materials as specified by the user.
3. Neoprene grommets with molded-in compression rings.
4. A spacer that completely encloses phase conductors and messenger.
5. A high strength supporting messenger that provides storm damage protection, thereby permitting . . .
6. Longer spans—the system messenger permits spans up to 300 feet.
7. Positive phase identification by position in spacer.
8. Lower reactance than conventional open-wire lines.
9. Ease of installation.
10. Neat, compact overhead distribution. Better public relations.

Send in the coupon for our new bulletin on Rome TRIMLINE* Primary Distribution System.

For phone number of closest representative see advertising index in back of book.

SEND FOR FREE BULLETIN!



ROME CABLE

CORPORATION

Dept. 46, Rome, N. Y.

I want more information on the Rome TRIMLINE Primary Distribution System. Rush me my free copy of Bulletin RCP-790.

Name .....

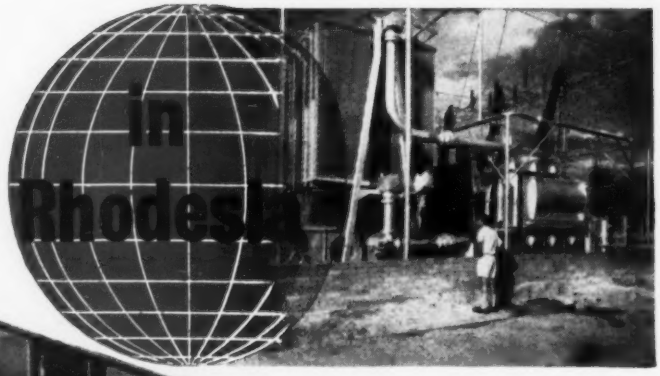
Title .....

Company .....

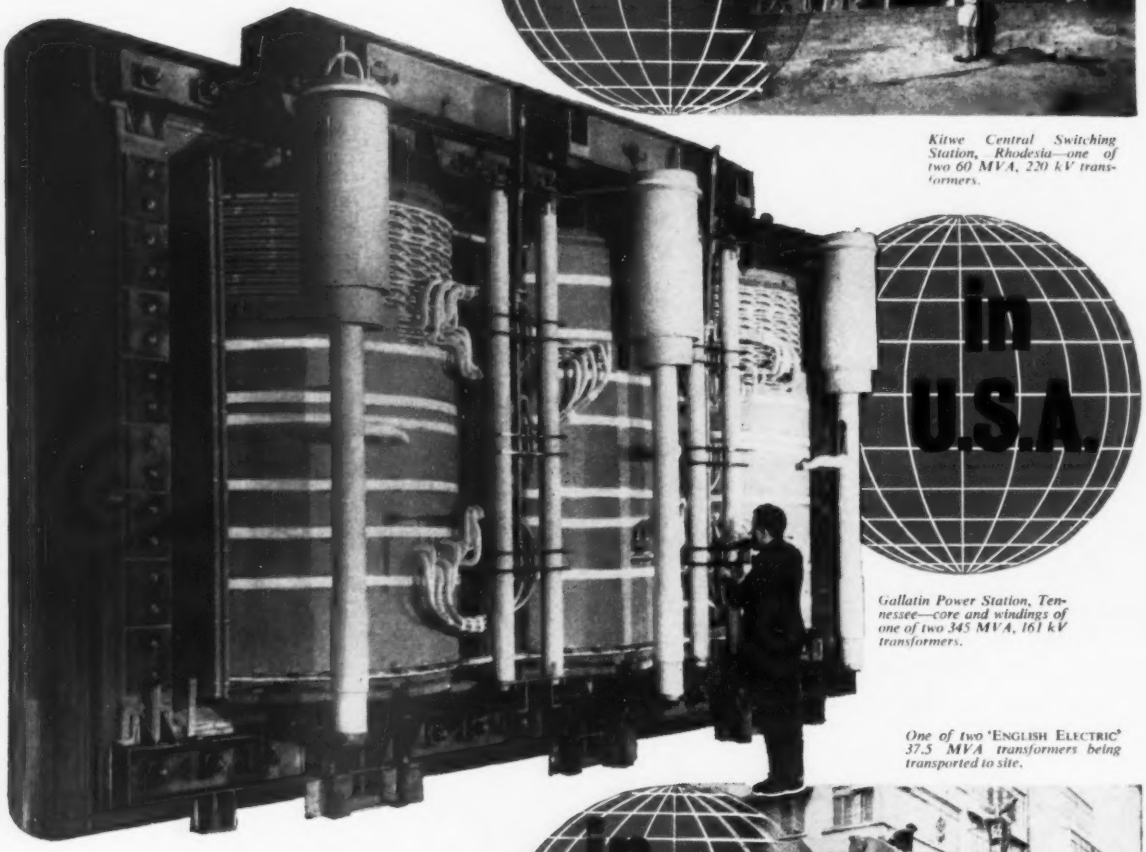
Street .....

City ..... *State* .....

Transforming the WORLD'S POWER

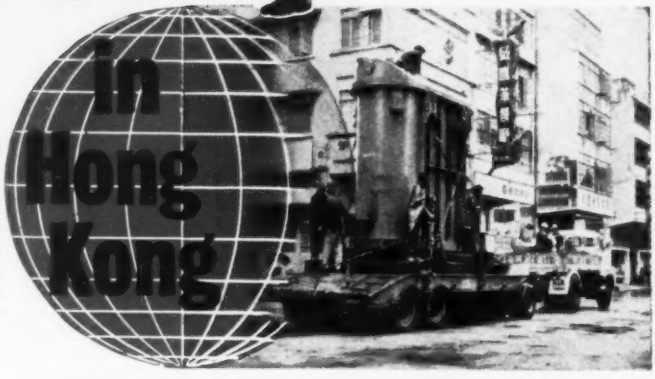


Kitwe Central Switching Station, Rhodesia—one of two 60 MVA, 220 kV transformers.



Gallatin Power Station, Tennessee—core and windings of one of two 345 MVA, 161 kV transformers.

One of two 'ENGLISH ELECTRIC' *37.5 MVA transformers being transported to site.*



'ENGLISH ELECTRIC' transformers are in service throughout the world and can be supplied for voltages up to the highest envisaged and for outputs up to the largest practicable.

Two of the largest transformers in the world—345 MVA, 22.5/161 kV, 3-phase, 60 cycles—have been supplied by 'ENGLISH ELECTRIC' to a T.V.A. power station in Tennessee. Contracts have been completed and are in course of manufacture for many other major American power projects.

'ENGLISH ELECTRIC' products cover all aspects of the generation, transmission and utilization of electric power. Service facilities are available through three large Canadian plants.

'ENGLISH ELECTRIC'

Agents for Washington, Oregon, Montana, Idaho, Wyoming, Nebraska, California, Arizona, Utah, Nevada and Alaska; **James I. Metcalf & Co. Inc.**, 701 United Pacific Building, Seattle 4, Washington. Branch offices in San Francisco, Los Angeles, Portland, Phoenix. Agents for Georgia, Alabama, Tennessee, South Carolina Florida and Kentucky: **Osgood & Associates, Inc.**, 988 Spring St. N.W., P.O. Box 7383, Station C, Atlanta 9, Ga. Branch office in Birmingham, Ala. Agents for Louisiana and Mississippi: **Electron Equipment Co. Inc.**, 1050 Constance St., New Orleans 13, La. Agents for Texas, Oklahoma, Arkansas and New Mexico: **Peabody Bros.**, 2903 St. Louis St. at Oakland, Dallas 26, Texas. Branch offices in Houston and Tulsa.

Enquiries for territories not covered by Agents should be directed to:

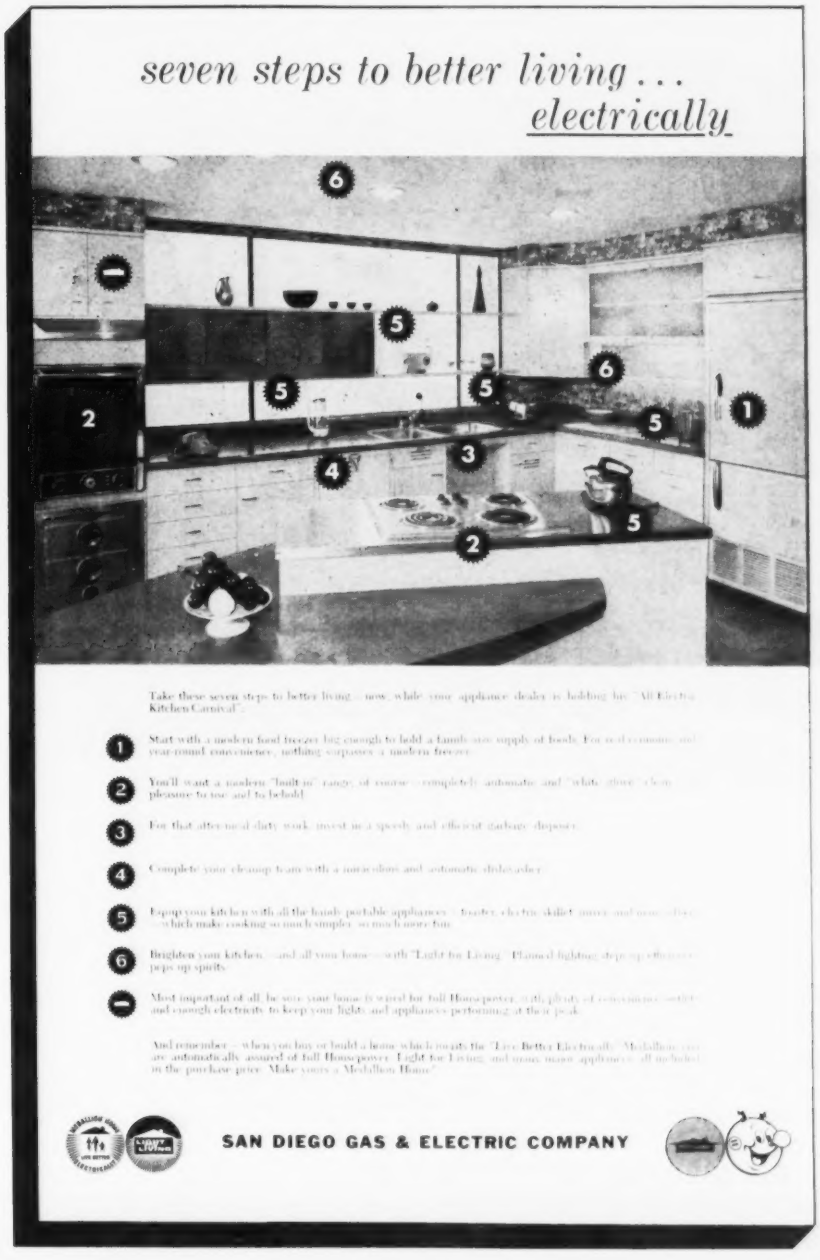
ENGLISH ELECTRIC EXPORT & TRADING CO. LTD., 750 THIRD AVENUE, NEW YORK 17, N.Y. Telephone: MURRAY HILL 7-0303

OC/US/1

WE'RE KEEPING IN STEP WITH THE E. E. I.

This advertisement—headlined "Seven Steps to Better Living . . . Electrically"—was one of a current series developed by San Diego Gas & Electric Company to take local advantage of the national "All-Electric Kitchen Carnival" sponsored by the Edison Electrical Institute.

Today, as in the past, we find we can achieve exceptional impact, at modest cost, through identification with the million-dollar programs conducted on a nationwide scale by the E.E.I.


seven steps to better living . . .
electrically
6
5
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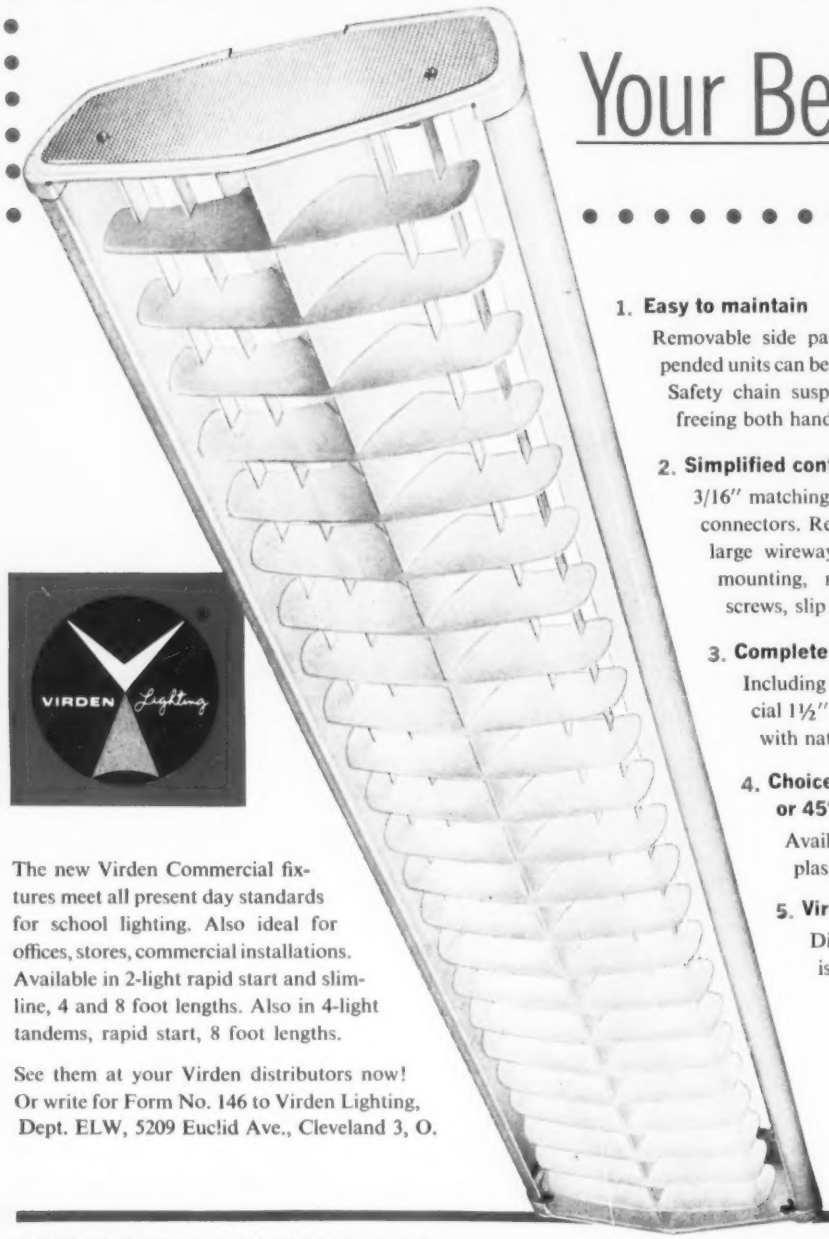
2
Take these seven steps to better living — now, while your appliance dealer is holding his "All-Electric Kitchen Carnival".
1 Start with a modern food freezer big enough to hold a family-size supply of foods. For real economy and year-round convenience, nothing surpasses a modern freezer.
2 You'll want a modern "built-in" range, of course — completely automatic and "white-glove" clean — a pleasure to use and to behold!
3 For that after-meal dirty work, invest in a speedy and efficient garbage disposer.
4 Complete your cleanup team with a noiseless and automatic dishwasher.
5 Equip your kitchen with all the handy portable appliances — toaster, electric skillet, mixer and more coffee — which make cooking so much simpler, so much more fun.
6 Brighten your kitchen — and all your home — with "Light for Living". Planned lighting does up-to-the-minute pep up spirits.
Most important of all, be sure your home is wired for full Housepower, with plenty of convenience outlets and enough electricity to keep your lights and appliances performing at their peak.
And remember — when you buy or build a home which meets the "Live Better Electrically" Medallion standard, you are automatically assured of full Housepower, Light for Living, and many major appliances all included in the purchase price. Make yours a Medallion Home.
SAN DIEGO GAS & ELECTRIC COMPANY

Five distinctive features

make this new VIRDEN Commercial Fixture

Your Best Buy!



1. **Easy to maintain**
   Removable side panels. No tools required. Suspended units can be relamped from above or below. Safety chain suspends louvres out of the way, freeing both hands for maintenance.

2. **Simplified continuous row installations**
   3/16″ matching K.O's. in end plates eliminate connectors. Rectangular K.O's. provide extra large wireway for easier wiring. For stem mounting, mounting plates have preset screws, slip into key holes in channel.

3. **Complete mounting accessories**
   Including rigid and swivel stems plus special 1½″ on-ceiling outlet box to comply with national code.

4. **Choice of 35° x 25°, 35° x 45°, or 45° x 45° shielding**
   Available in metal or polystyrene plastic side panels.

5. **Virden quality throughout**
   Die stamped steel. Bonderized finished in white high-baked enamel.

VIRDEN Lighting

The new Virden Commercial fixtures meet all present day standards for school lighting. Also ideal for offices, stores, commercial installations. Available in 2-light rapid start and slimline, 4 and 8 foot lengths. Also in 4-light tandems, rapid start, 8 foot lengths.

See them at your Virden distributors now! Or write for Form No. 146 to Virden Lighting, Dept. ELW, 5209 Euclid Ave., Cleveland 3, O.

Find Your Nearest Dealer In The Yellow Pages

VIRDEN LIGHTING . . . Division of John C. Virden Company • Cleveland 3, Ohio

Member American Home Lighting Institute

For phone number of closest representative see advertising index in back of book.

Underground distribution system savings begin the day you decide to install J-M Transite Ducts. You can figure on lower operating costs, prolonged insulation life, more reliable service and longer cable life.

J-M Transite Ducts permanently resist fire and arc... provide lifelong dependability, many operating economies

GONE ARE MANY of the headaches of transmitting heavy electrical loads underground, when you protect cables with Johns-Manville Transite® Ducts. They assure you of greatest protective value, and maximum load capacity, per dollar invested.

And when cable fire or failure occurs, noncombustible Transite Ducts remain undamaged and can be used again for the new lines. Regardless of conditions, Transite Ducts provide permanent service as they do not deteriorate from heat, water or corrosive soils.

Tests have shown that Transite-protected cables run cooler under given loads . . . carry greater loads at given temperatures because Transite helps dissipate heat faster. And for lower operating costs, consider the long-range value of Transite Ducts in terms of (1) increased insulation life, (2) fewer cable failures, and (3) lower I^2R losses for the full working life of a system.

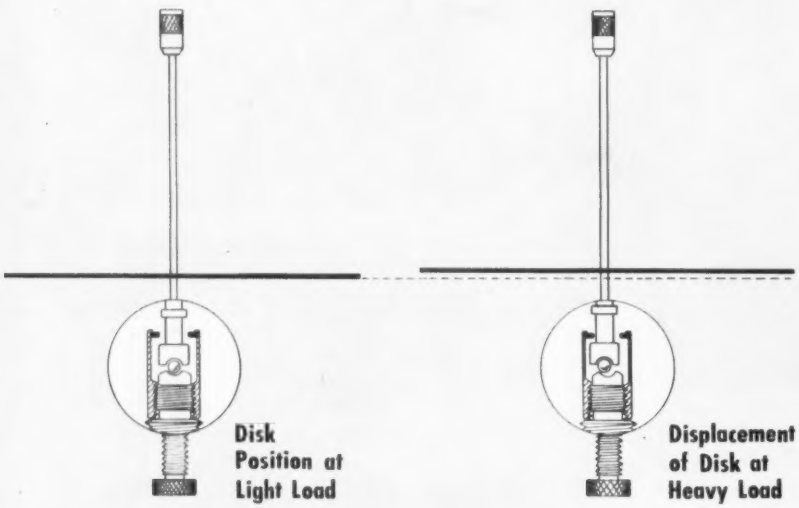
For details on Transite Ducts' many advantages, distribution engineers are invited to write for informative brochure EL-29A. Johns-Manville, Box 14, New York 16, N.Y. In Canada, 565 Lakeshore Road East, Port Credit, Ont.

JOHNS-MANVILLE

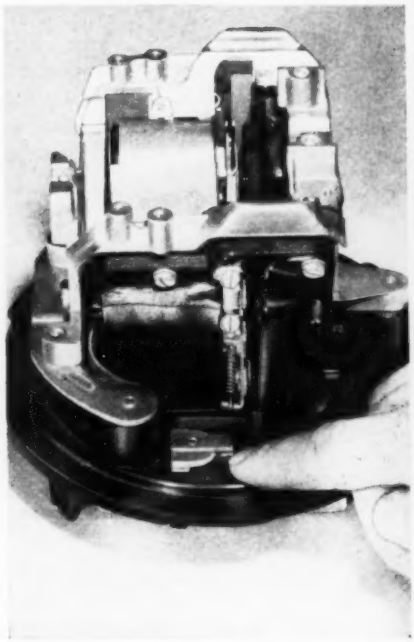
For phone number of closest representative see advertising index in back of book.

5 WAYS

Here's Why General Electric's New, Complete



OLD-STYLE BALL-BEARING SYSTEM



1 MAGNETIC SUSPENSION ASSURES ACCURACY THROUGH FULL METER RANGE—With conventional ball and jewel bearing system, higher loads can force the disk out of position and cause inaccurate meter readings. Because the disk in General Electric polyphase meters floats free, there's never a danger of disk displacement at any load . . . meter readings are accurate through full meter range.

In addition, because there are no ball bearings in G-E's magnetic suspension system, you eliminate bearing inspection, cleaning and replacement costs. You also minimize revenue losses because this free-floating system reduces friction-caused tilt errors.

2 COORDINATED INSULATION SYSTEM PROVIDES MAXIMUM SURGE PROTECTION—Exclusive series gap design, with magnetic blowout, offers best protection against lightning and other surges. Flashover is controlled and the resulting arcs extinguished within ½-cycle by this unique gap design.

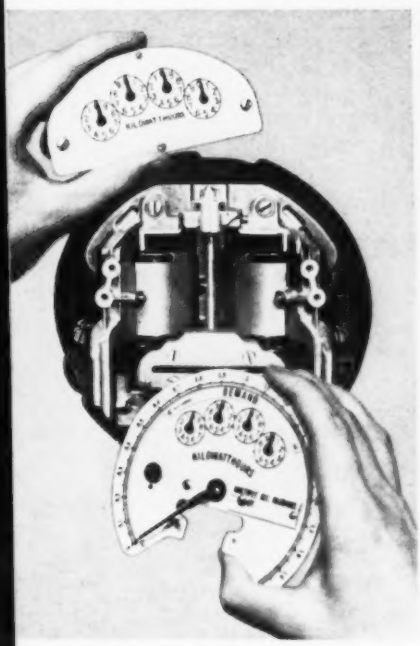
THESE FIVE EXCLUSIVE FEATURES, together with unexcelled load and power factor performance, combine to make the General Electric V-60's your best meter buy.

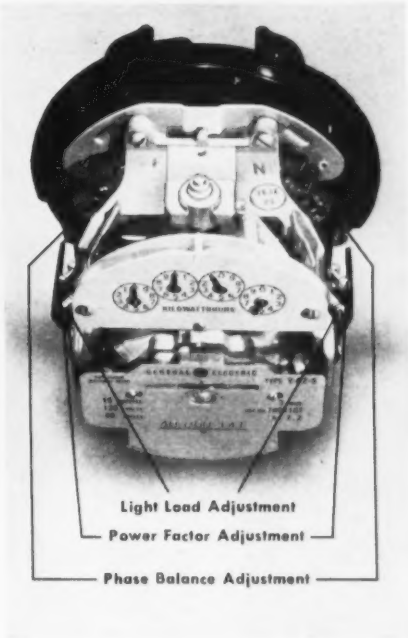
There's a G-E V-60 meter to handle every Class 10, 100 or 200 two-stator polyphase application. Depending upon your needs, specify the V-62 (network and 3-wire, 3-phase), V-63 (3-wire, 3-phase), V-65 (4-wire Y, 3-phase), or the V-66 (4-wire △, 3-phase).

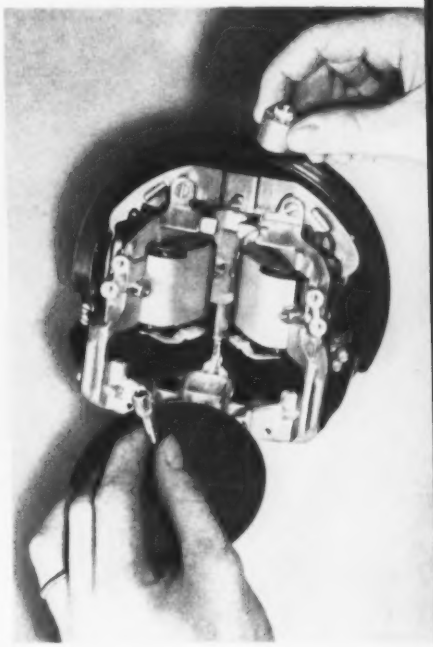
FOR COMPLETE INFORMATION on G-E's new V-60 polyphase meter line, contact your nearest G-E apparatus sales representative or write General Electric Company, Section 628-28, Schenectady 5, N. Y.

BETTER

V-60 Polyphase Meter Line Is Your Best Buy!







3 NEW POLYPHASE METER LINE GIVES YOU GREATER VERSATILITY – V-60 meters accommodate either kilowatt-hour or demand registers without use of adaptors or intermediate gearing. Any G-E demand register manufactured in the last ten years can be used on V-60's as well as on any other G-E meter.

4 ONLY V-60 METERS OFFER COMPLETE, INDIVIDUAL STATOR ADJUSTMENTS—General Electric's advanced V-60 design provides complete vernier adjustments on each stator for all polyphase load conditions. Meters you receive are precisely calibrated for optimum performance. Only one of the light load adjustments is required for normal calibration "touch-up."

5 EXCLUSIVE "V" STATOR DESIGN SIMPLIFIES FIELD MODIFICATION—Because of G-E's unique "V" stator design, disk and shaft assembly can be removed to accommodate contact devices and detents without disassembling meter. Precisely doweled magnet location eliminates need for recalibration.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For phone number of closest representative see advertising index in back of book.

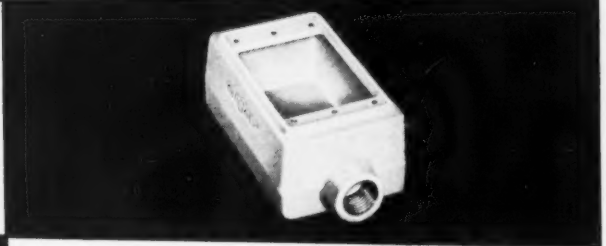
Cut costs... without cutting corners! Specify... GEDNEY CONDUIT BODIES

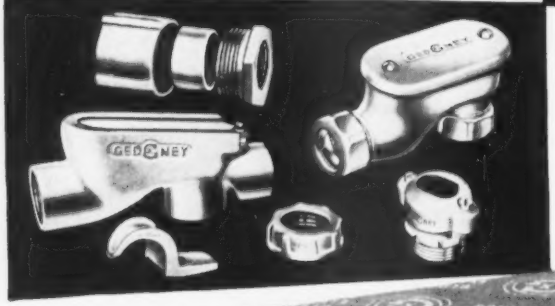
Gedney Conduit Bodies mean lowest installed cost! That's because they are skillfully made of tough, *malleable* iron, then hot-dip galvanized, and finally, they must pass the toughest inspection. Accurate machining and threading assure easiest installation . . . ruggedness assures longest service life!

THE GEDNEY CONDUIT BODY LINE INCLUDES ALL TYPES—SIZES ½" TO 4"

TYPE LB—Threaded—for heavy-wall rigid conduit. Use them with Gedney entrance fittings, straps, clamp backs to get an *entire* conduit system that is hot-dip galvanized.

TYPE FS—Threaded—shallow bodies for heavy-wall rigid conduit. Hot-dip galvanized finish prevents corrosive deposits—means easier installation, longer life.





SCORES OF OTHER GEDNEY FITTINGS are available for every purpose—all carefully designed, manufactured and inspected to assure economical installation and maximum customer satisfaction.

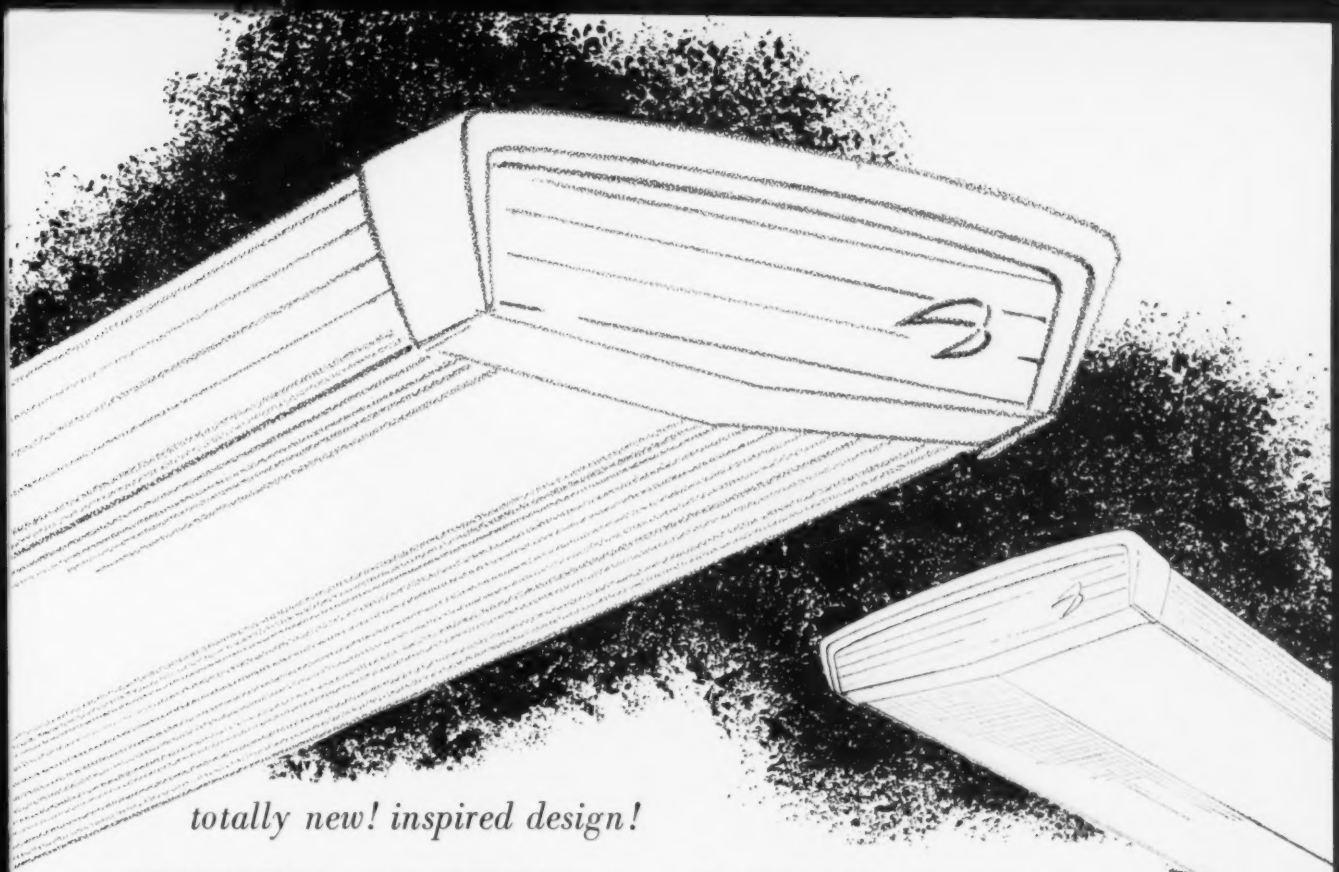
GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

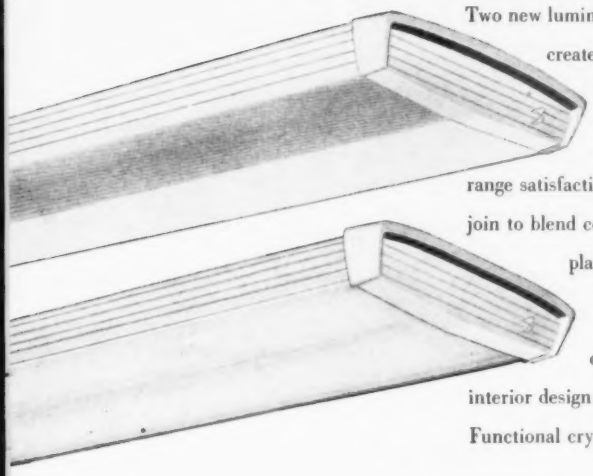
RKO BLDG., RADIO CITY, NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

For phone number of closest representative see advertising index in back of book.



totally new! inspired design!

VISITRON and REGULA...2 versatile luminaires in the new Curtis Designer Group



Comes now a truly forward concept in lighting fixture styling. Two new luminaires by Curtis, first in a *Designer Group*, created in the contemporary mood.

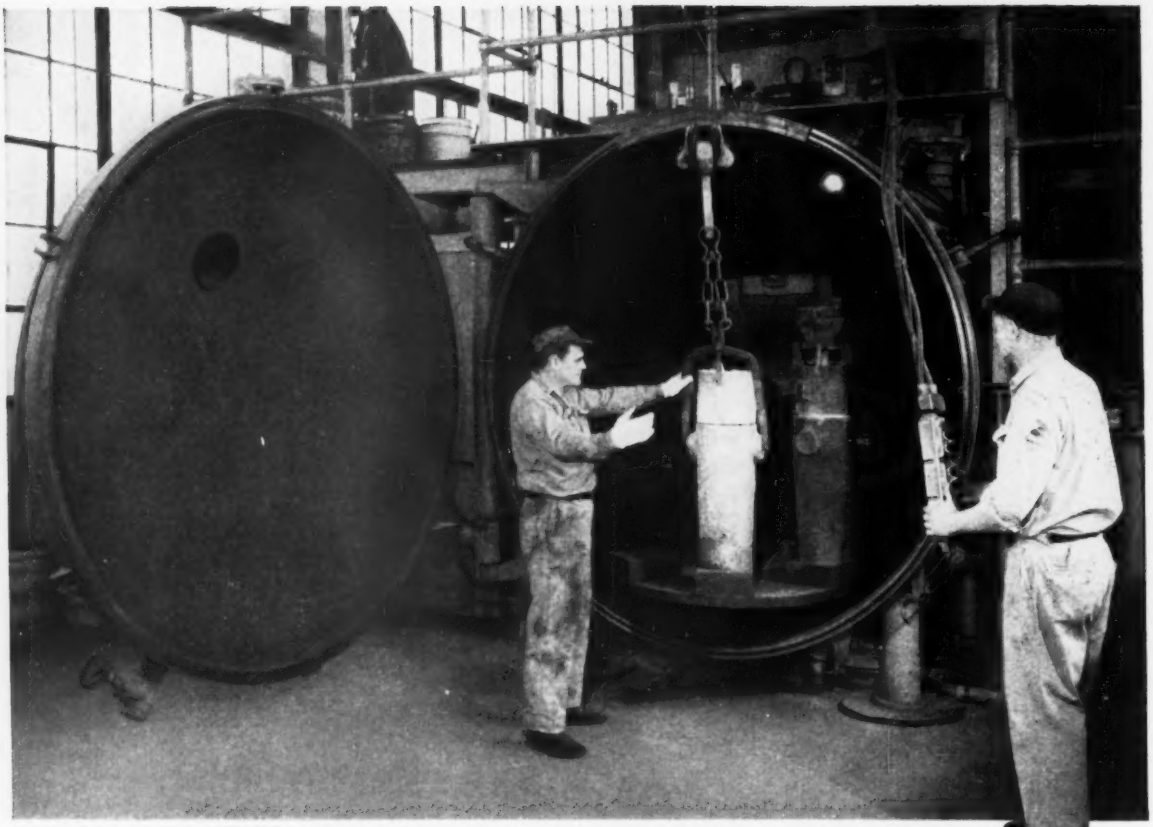
THE VISITRON . . . brimming in trim, slim-line beauty with the future "designed in" to offer long range satisfaction. Here imagination and entrancing realism join to blend contemporary design with the traditional in illumination. White plastic diffusers provide a luminescence extremely pleasing to the eye.

THE REGULA . . . ushering in an advanced trend that will be here for years to come. Smooth flowing contours dwell in harmony with today's contemporary interior design . . . blend with the specially chosen furnishings of any decor. Functional crystal plastic prismatic refractors create a sparkling lighting effect.

Curtis-AllBrite Lighting, Inc.,
Curtis Lighting Division, 6135 W. 65th St., Chicago 38, Ill.
AllBrite Lighting Division, 352 Shaw Rd., So. San Francisco, Cal.
Visioneers in Planned Lighting.

CURTIS

DESIGNER GROUP



NOW EXCLUSIVELY VACUUM MELTED
KARMA High Resistance Alloy
THERLO Glass Sealing Alloy

This dramatic "first" in the manufacture of nickel alloys by Driver-Harris has been achieved by expanded vacuum melting capacity. It is still another example of our continued leadership in producing electrical and electronic nickel alloys of the highest purity.

D-H vacuum melting produces alloys of higher ductility and tensile properties. These are achieved by greatly reducing inclusions, especially oxides and nitrides. Other direct benefits are elimination of gas, not only from the surface but from the entire mass, and general improvement in the electrical, electronic and mechanical properties to meet critical specifications.

For additional information about Karma, Therlo and the other 130 high-nickel alloys manufactured by Driver-Harris, write for a copy of the D-H Alloy Manual.

*T.M. Reg. U.S. Pat. Off.

VACUUM MELTED KARMA* *High Resistance Wire*

The temperature coefficient of superior KARMA resistance wire has been improved to less than ±10 parts per million from —60°C. to +125°C. Higher stability and linearity are added to these important properties.

- Low thermal EMF against copper (equaled only by Manganin)
- Improved ductility
- High resistance to oxidation
- Wire sizes down to .0005"
- 800 ohms per circular mil foot

VACUUM MELTED THERLO* *Glass Sealing Alloy*

Improved workability is the major result of vacuum melting THERLO . . . the long established cobalt, nickel, iron alloy for sealing to hard or thermal shock resistant glass.

THERLO also:

- Produces a permanent vacuum-tight seal with simple oxidation procedure
- Resists mercury
- Is readily machined and formed—deep drawn or spun
- Can be welded, soldered, brazed
- Is available as rod, wire, strip, sheet foil—and in special shapes

DRIVER-HARRIS* COMPANY

HARRISON, NEW JERSEY • BRANCHES: Chicago, Detroit, Cleveland, Louisville

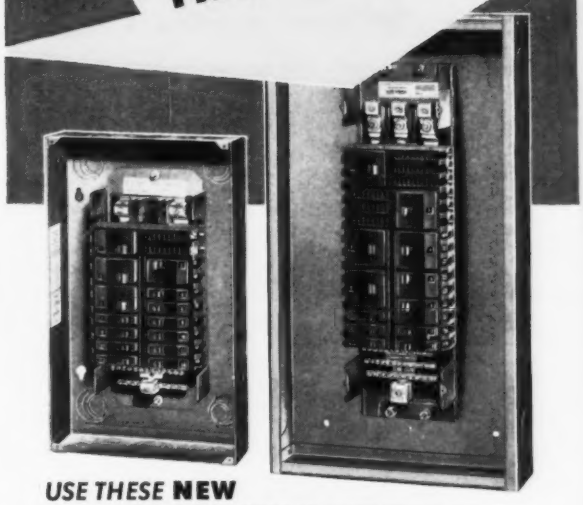
Distributor: ANGUS-CAMPBELL, INC., Los Angeles, San Francisco • In Canada: The B. GREENING WIRE COMPANY, Ltd., Hamilton, Ontario

MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

QO
FINEST BREAKER EVER BUILT!

NOW— 15 thru 100 amps

USE THEM in BOTH LOADCENTERS AND PANELBOARDS!

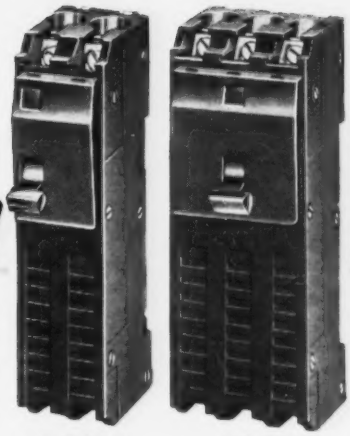


USE THESE **NEW 100 AMP UNITS LIKE THIS...**

As MAIN BREAKERS in any loadcenter or panelboard... just plug them in! Or as 100 ampere maximum, 2 or 3 pole BRANCH BREAKERS for motor loads, electric heating loads, and sub-feeds to other panelboards.

Write **for Bulletin SD-100. Address Square D Company, 4335 Valley Boulevard, Los Angeles 32, California**

NEW!



NEW!

2-POLE 70-100 Amp

3-POLE 70-100 Amp

DESIGN LEADERSHIP FEATURES OF THE **NEW 100 AMP Q1 BREAKERS**

- Fit all existing QO loadcenters and NQO panelboards
- Plug-in units let you assemble loadcenters and panelboards to meet any requirement
- Lugs are approved for aluminum or copper #1/0 wire
- *Quick-make, quick-break. Prevents "teasing"*
- *Trip indication. Tells instantly whether circuit has been turned off intentionally or "tripped"*
- Temperature compensated—prevents nuisance tripping
- Common trip prevents single phasing or personal injury
- Single handles for modern, streamlined appearance
- Plated jaws and connectors assure positive connections
- *Heavy-duty industrial quality for long life and trouble-free operation*

THE "QO" FAMILY

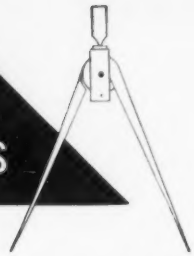
QO 1-POLE 15-50 Amp | QO 2-POLE 15-70 Amp | QO 3-POLE 15-50 Amp | Q1 2-POLE 70-100 Amp | Q1 3-POLE 70-100 Amp

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

For phone number of closest representative see advertising index in back of book.

ENGINEERED INTO BLACKBURN'S COMPRESSION CONNECTORS



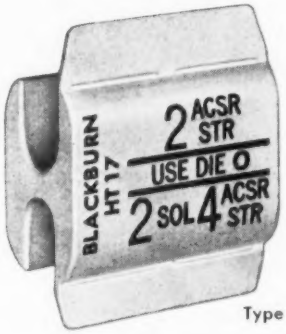
High Conductivity-

Blackburn has engineered all compression connectors shown to fit your present tooling program—and added advantages to meet engineers' and linemen's requirements.

Type SH

Type HT Prefilled

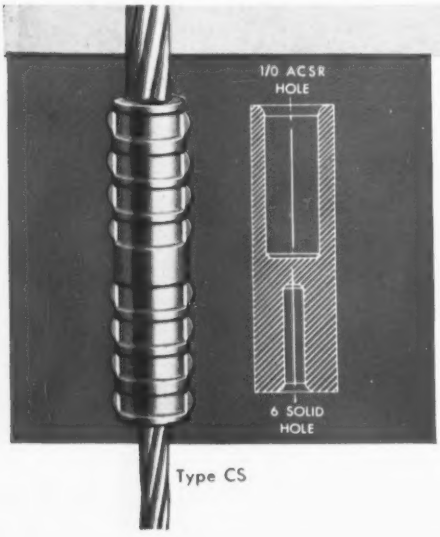
Type SH Prefilled



Type HT

Standardization now possible with Blackburn "H" frame connectors

- **Designed to fit the tools you already have for applying "H" frame type connectors.**
- **Full length tab completely seals out moisture, easiest to bend and install!**
- **Shot blasted to improve conductivity and retard corrosion.**
- **Prefilled with Blackburn's superior oxide-inhibiting compound, Contax, in easy-tear tab vacuum package.**
- **Color fast, large, easy-to-read lettering.**
- **Type HT is reversible, both grooves "open". For large aluminum tap to smaller copper main. Also used for dead ending.**



Type CS

You get higher conductivity with Blackburn service entrance sleeves

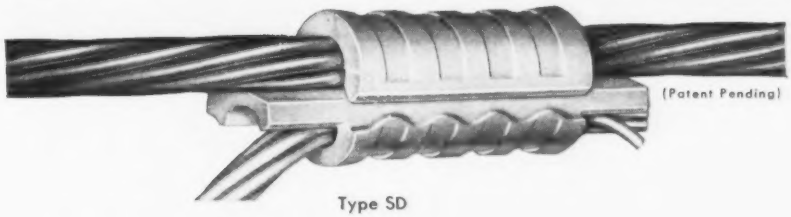
Blackburn—and Blackburn *alone*—provides greater contact area where needed, to assure greater conductivity. This is accomplished by increasing hole depth as the diameter of the conductor is increased, thereby providing more contact area for the conductors being connected.

The Color Coding is *printed* for quick, positive identification.

The sleeves' ends are sealed with Aluminum Sensitized Tape, which is easy to puncture . . . and, if a particle of the seal is pushed into the chamber, the particle is conductive.

Contax, Blackburn's superior oxide-inhibiting compound, is already in these sleeves *in measured amount.* Won't squirt out on glove or in face. And the solid center stop in a Blackburn Sleeve assures proper distribution of the inhibitor around the conductors. Designed for tooling you have.

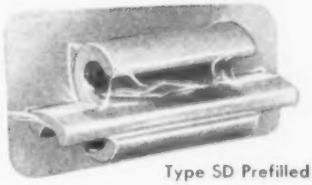
High "Use-Ability"



Type SD

Exclusive drip-guard separator in Blackburn 6-frame tap connector gives *extra* protection to bi-metallic connections

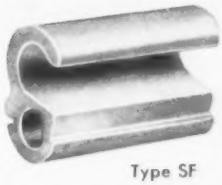
- Spacer allows SD Connector to be used for bi-metal connections with the tools you already have for "C" Frame type connectors.
- An economical substitute for "L" taps, since extended drip guard gives extra insurance against corrosion products bridging the bi-metallic gap.
- A true *two-handed* connector, very adaptable for hot line work.
- Shot blasted for highest conductivity and corrosion resistance.
- Prefilled with Blackburn's Contax and vacuum packed for insurance against corrosion.



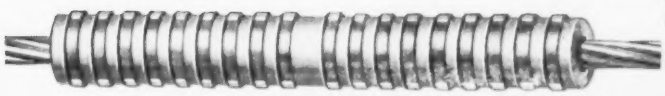
Type SD Prefilled

Type SF

- Recommended for aluminum to aluminum.
- Spacer gives better protection against strand breakage.
- Can be installed with same tooling used for Type SD.
- Prefilled with Blackburn's Contax and vacuum packed for insurance against corrosion.



Type SF



Type TR

Blackburn neutral repair sleeves save dollars on triplex services

- Salvage short lengths of pre-assembled service drop cable with Blackburn Sleeves.
- Designed for and tested with the tools you already have.
- Extra length engineered for neutral pullout values in keeping with dead end devices.

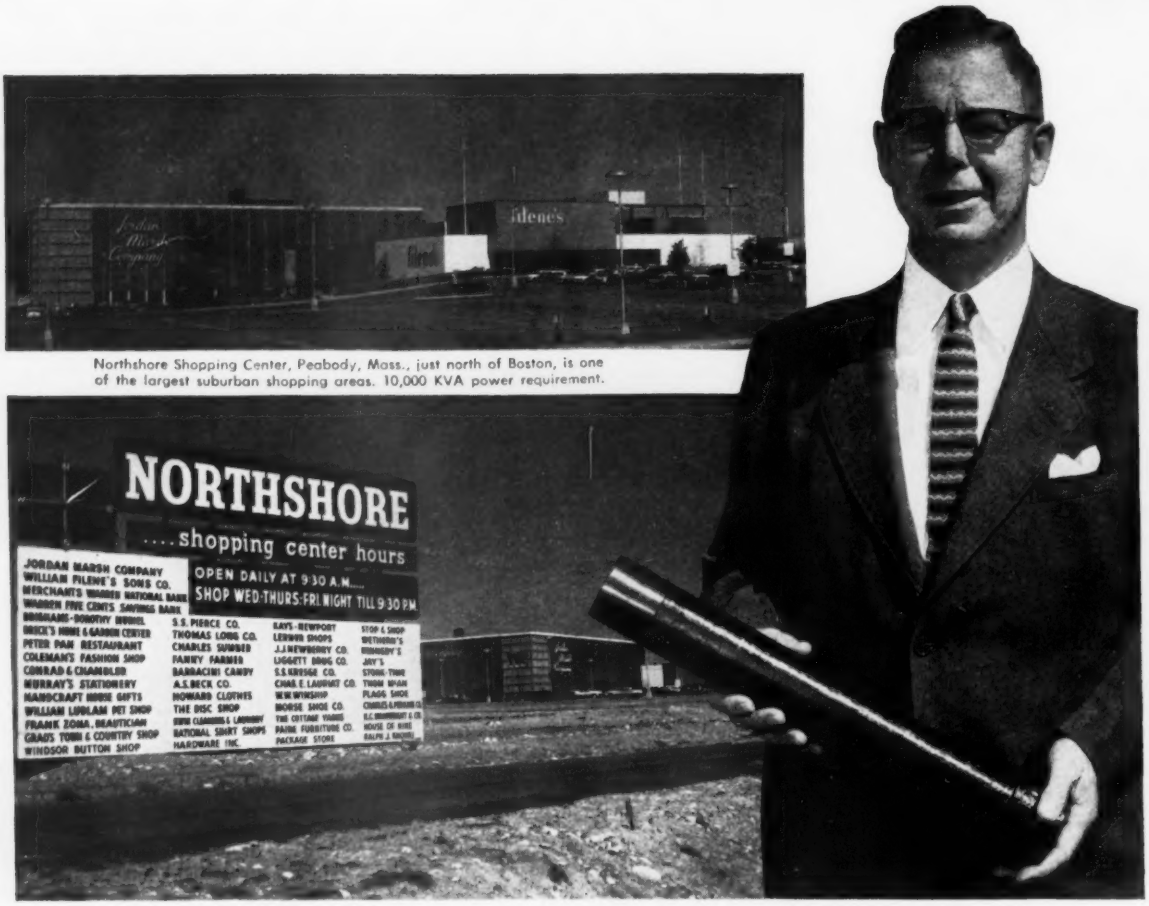
See JB Catalog 858 for Tooling INFORMATION

LIVE BETTER ELECTRICALLY

JASPER BLACKBURN CORPORATION

1525 Woodson Rd., St. Louis 14, Mo. • WYdown 3-9430

For phone number of closest representative see advertising index in back of book.



Northshore Shopping Center, Peabody, Mass., just north of Boston, is one of the largest suburban shopping areas. 10,000 KVA power requirement.

"Putting in BERMICO CONDUIT was the easiest part of the job"

AL KENWORTHY,
Electrical Contractor, Everett, Mass.

"When I saw the area to be wired, I expected the worst," reports Mr. Kenworthy, President of Kenworthy & Taylor. "It was craggy, rooted, and uneven."

"Luckily, Bermico was the specified conduit. Bermico is lightweight. It's easy to work with . . . its fittings simplify every installation problem. Putting in Bermico Conduit was the easiest part of the job."

For fast, money-saving installations . . . use Bermico on all your jobs. Bermico is made from cellulose fibre, impregnated with coal tar pitch. Each 8-foot length is precision engineered, with smooth inside bore to allow easy cable pull-through without abrasion. It has high dielectric strength. Bermico is long lasting, too . . . extremely resistant to acids, alkalies, heat, water and corrosion. Try it.

Distributed by WESTINGHOUSE Electrical Supply Company
Offices in Principal Cities

Another Quality Product of

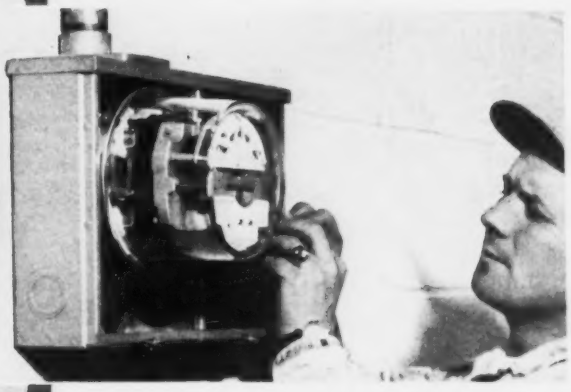
BROWN QUALITY COMPANY

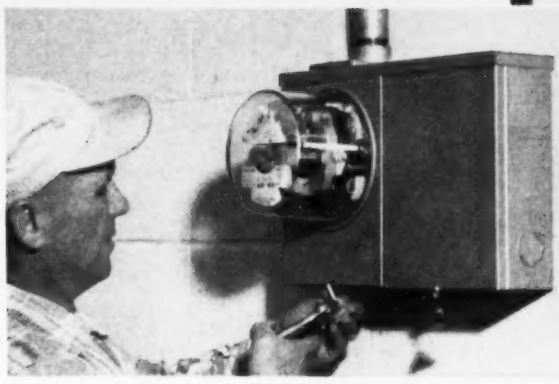
General Sales Office: 681 Market St., Dept. 1669, San Francisco, Calif. *Mills:* Berlin, N. H.; Corvallis, Oregon

For phone number of closest representative see advertising index in back of book.

It's a CAPACITOR...

It's a METER SOCKET...





IT'S THE NEW ORIGINAL SOCKET Secovar!

A secondary capacitor for *lowest* installed cost per kilovar

Sangamo Secovar 240 volt secondary capacitors are installed at the customer's service to give maximum system benefits all down the line. This new addition combines a 2 kvar capacitor with a meter socket. When used in new construction or when re-wiring, the only installation cost involved is that which would normally be required for a meter socket.

Sangamo's exclusive Secovar Capacitors are available in three types to meet your requirements: The new Type OS (Original Socket) 2 kvar rating; Type S, a 2 kvar rating for socket mounting; and Type N, a 1 or 3 kvar rating for nipple mounting. All types are fused and some models can be furnished with a Klixon thermostatic switch if desired.

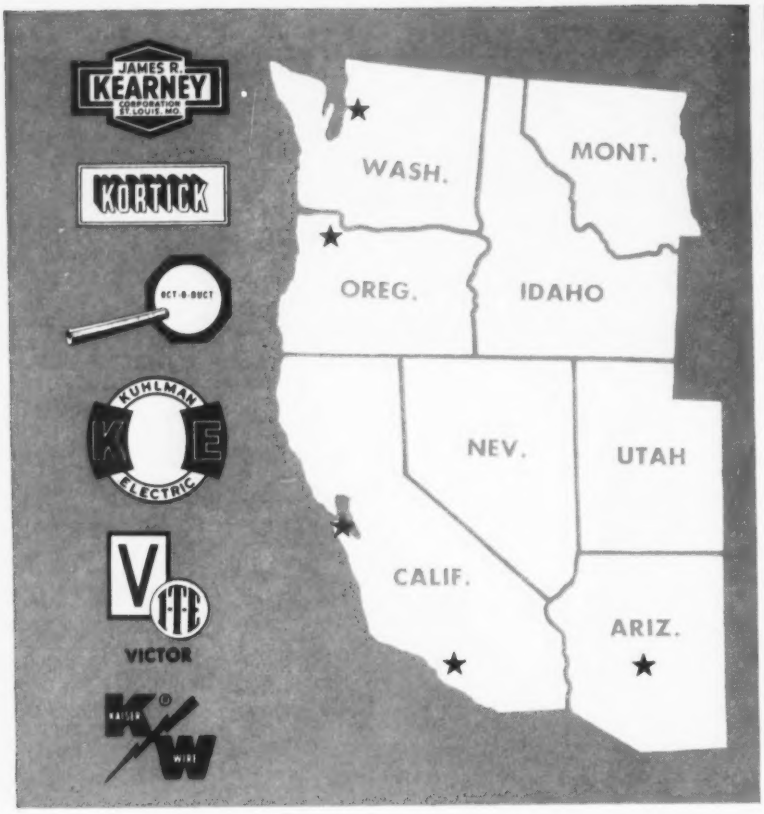
For details, consult your Sangamo Representative, or write for Bulletin 1132.

SANGAMO ELECTRIC COMPANY
Springfield, Illinois

PC59-3

60TH ANNIVERSARY SANGAMO 1899-1959

For phone number of closest representative see advertising index in back of book.



Complete Stock and Plenty of "Know-how"!

Your Maydwell & Hartzell representative knows his business . . . makes it a point to know yours, too. You'll find him willing and able to recommend the right equipment for every project while keeping within your budget.

Six M&H office warehouses are strategically located to give you competent assistance and quick deliveries. Get acquainted with your M&H man today—it pays to work with men who know their business.

MAYDWELL & HARTZELL

INCORPORATED

Engineering Sales Representatives

Suppliers of electrical transmission, distribution, communication equipment for Western Users.

Sales Offices and Warehouses

San Francisco 7	870 Tennessee Street	ATwater 8-6900
Los Angeles 13	427 W. Fifth Street	MAdison 8-7245
Phoenix	324 S. Second Avenue	ALpine 2-5858
Portland 10	2318 N.W. Vaughn Street	CApitol 8-4173
Seattle 9	306 Dexter Avenue	MAin 4-2368
Spokane 8	121 S. Monroe Street	MAdison 4-3285

LETTERS TO THE EDITOR

Sell Appliances First

To the Editor:

Congratulations on your "Electra's Husband" column in the April issue. This is a theme I have been hammering on for years, so I am particularly pleased to see a major industry publication taking up the issue.

Like you, I have no idea how many millions of dollars have been "spent" to sell Adequate Wiring and Housepower but I'm convinced that a similar amount spent to sell the advantages of the appliances that require additional wiring would have been far more productive.

M. G. Kennedy
Ebasco Services
New York City

Construction Highlights

Residential development, Salt Lake City, Utah, $8,000,000.

Chapel, Air Force Academy, Colorado Springs, Colo., $3,800,000.

Kennecott Copper plant modernization, Garfield, Utah, $10,000,000.

Fine Arts building, San Francisco, $2,000,000.

Chemistry building, University of California, Berkeley, Calif., $4,500,000.

Speech-Drama building, San Fernando Valley State College, Calif., $2,500,000.

Laboratory additions, Boulder, Colo., $1,200,000.

Expansion program, University of Wyoming, Laramie, $10,000,000.

Jail, Los Angeles, $19,450,000.

Hospitals: Lakewood, Colo., $2,000,000; Santa Ana, Calif., $5,000,000; Pacomia, Calif., $1,500,000; Monterey, Calif., $2,000,000.

Shop building, Pueblo, Colo., $2,000,000.

Memorial park and cemetery, Ignacio, Calif., $16,000,000.

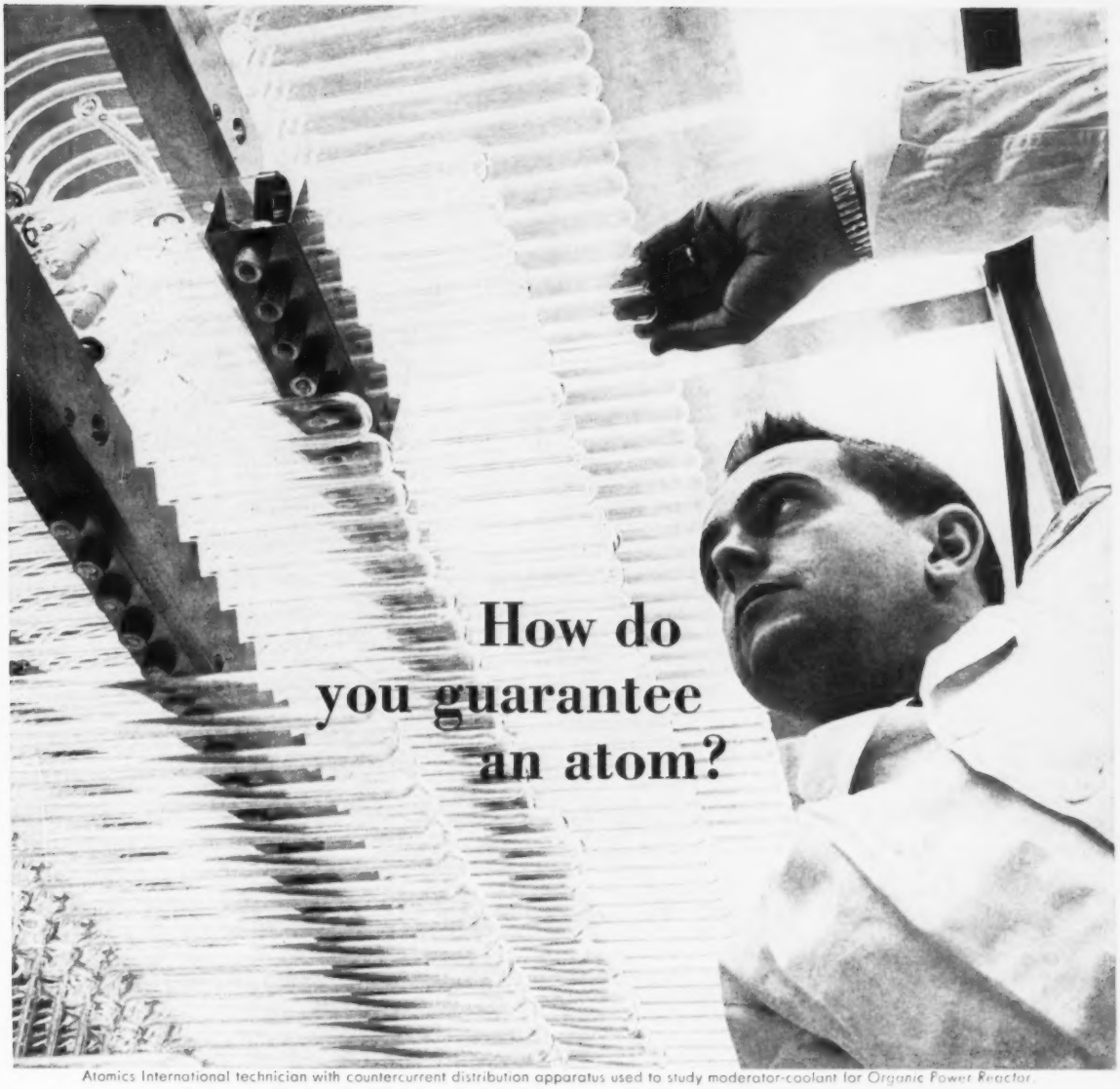
Capehart housing, 947 units, San Diego, $16,000,000.

Veterans Administration Center additions, Wadsworth, Los Angeles, $6,750,000.

Office building, Menlo Park, Calif., $2,700,000.

Retirement home, Newberg, Ore., $1,500,000.

Sulphuric acid plant, Pocatello, Idaho, $1,500,000.



Atomics International technician with countercurrent distribution apparatus used to study moderator-coolant for Organic Power Reactor.

Begin with the knowledge of experienced scientists... conduct a seven-year research and development program ...collect a wealth of solid operating experience. Result: GUARANTEED PERFORMANCE of a nuclear power reactor, designed by Atomics International to help meet the world's power needs.

This is the ORGANIC POWER REACTOR—outgrowth of research and development on the organic system and operation of the Organic Moderated Reactor Experiment (OMRE) conducted by Atomics International for the U.S. Atomic Energy Commission.

Outstanding advantages of the ORGANIC POWER REACTOR: Low capital investment • Low cost operation • High inherent safety and flexibility • Reliability resulting from

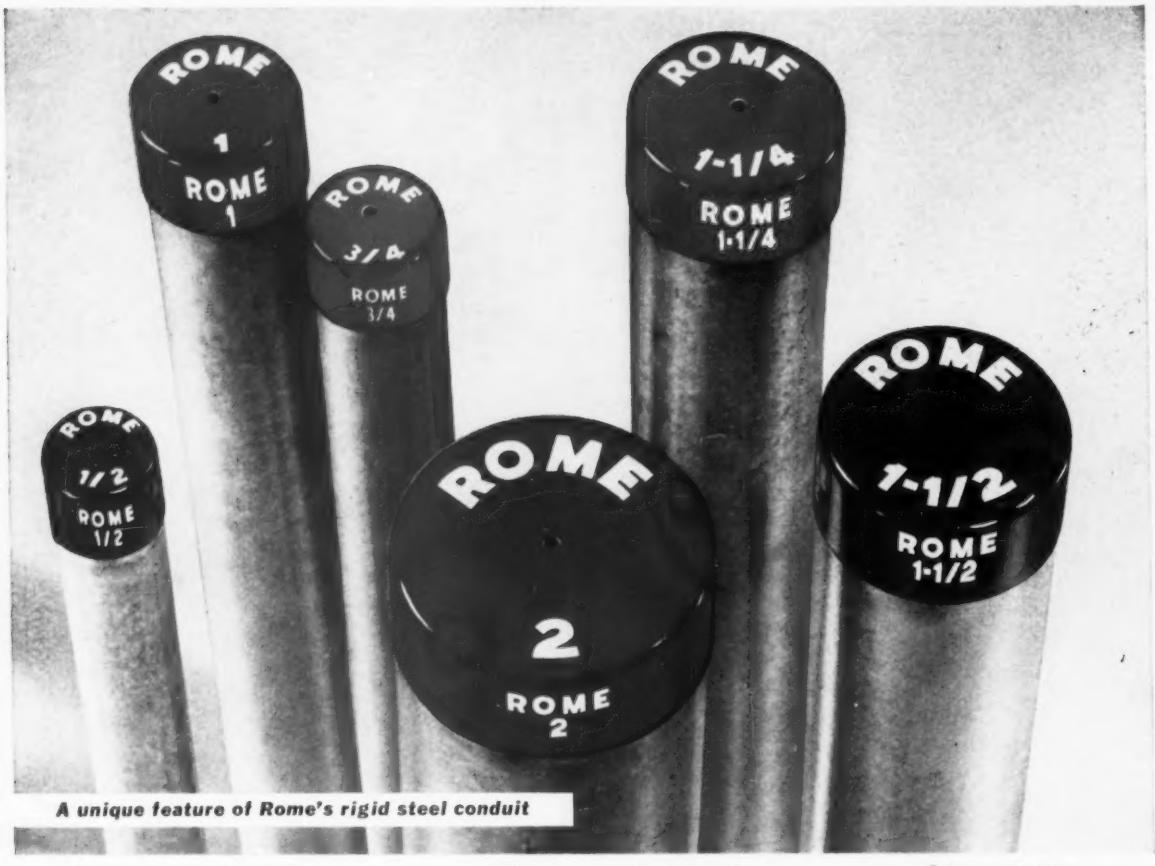
- **Non-corrosive moderator coolant**
- **Low pressure system**
- **Conventional, off-the-shelf components and materials**
- **Easy access during operation**

Atomics International is ready to furnish complete ORGANIC REACTOR electric power plants, including fuel elements, in a wide range of power levels. An experienced field staff will assist with initial plant operation, personnel training and maintenance procedures.

For details contact: ATOMICS INTERNATIONAL, Canoga Park, California, U.S.A. Cable address: ATOMICS.

ATOMICS INTERNATIONAL
A DIVISION OF NORTH AMERICAN AVIATION, INC.
PIONEERS IN THE CREATIVE USE OF THE ATOM

Other offices in: Washington, D.C., U.S.A.; Geneva, Switzerland, Affiliated with: INTERATOM, Bensberg/Cologne, Federal Republic of Germany



A unique feature of Rome's rigid steel conduit

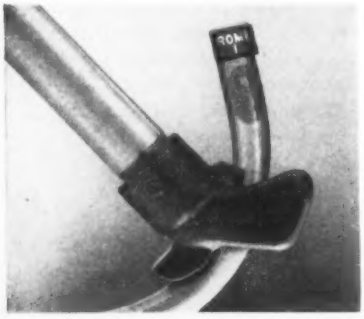
● Blue . . . 1", 2", 3", 4", 5", 6" ● Black . . . ½", 1¼", 2½", 3½" ● Red . . . ¾", 1¼"

How you can save up to 20¢ per stub-up with Rome's size-imprinted thread protectors

Do your men cap conduit stubs in the usual but *costly* way?

Do they place a seal over the stub and cap it with a bushing? This is one way of doing the job, but the one or two minutes it takes can cost you up to 20¢ *every time a stub is capped.*

Now Rome's rigid steel conduit comes to you with unique *steel* thread protectors that eliminate capping time altogether.



Rome's color-coded, size-imprinted caps help you save three ways:

1. You can simply bend a stub-up with the Rome thread protector in place, then leave it. No time lost in searching for seals and bushings to protect the conduit from concrete, dirt or stones.
2. Rome's thread protectors are made of *steel* to prevent damage to the threads. They fit snugly enough to stay on the conduit, yet are easily removed without damaging either the threads or the protector itself.
3. You can see the piece of conduit you want at twenty paces. Rome's thread protectors are color-coded to give you easy and immediate size identification and the size is clearly printed both on the top and around the side. No time is lost searching through stacked conduit for a particular size.

These thread protectors are just one of the features that make Rome rigid your best rigid conduit buy. Specify Rome's conduit for your next job. Contact your Rome Cable representative for more information—or write to Department 947-R, Rome Cable Corporation, Rome, New York.

Western Sales Offices

DENVER 3, COLORADO
1160 Elati Street
(Tel. Keystone 4-0533)

SALT LAKE CITY 1, UTAH
230 South 4th West
(Tel. Elgin 9-8811)

LOS ANGELES 22, CAL.
2510 South Malt Avenue
(Tel. Raymond 3-3631)

SAN FRANCISCO 24, CAL.
1100 Selby Street
(Tel. Valencia 6-3580)

PORTLAND 5, OREGON
1224 S. W. Morrison St.
(Tel. Capitol 2-5470)

SEATTLE 4, WASHINGTON
3430 Fourth Avenue, So.
(Tel. Main 4-3017)

ROME CABLE
CORPORATION

ELECTRA'S HUSBAND

Page Robin Hood

A group of us, homeward bound from the convention, had congregated in the lounge of the DC-6B and the gin game had been interrupted by the arrival of a steward carrying champagne glasses. Fred put down the magazine he had been reading and said casually: "It says here that the Russians can afford to play a waiting game."

"That ought to start the conversational ball rolling," I observed. "What's the pitch?"

"Well," replied Fred, "the fiscal policies of the government are getting wackier all the time. This article I just finished intimates that democracy is not long for this world. Foolish spending, an idiotic tax structure and federal paternalism are moving the country into a position where all-out socialism will be the only answer to a debased currency. The author distilled the situation into a succinct phrase—he calls it the Robin Hood economy."

"That's really not too bad," another one of the group commented, "but isn't the whole trend nowadays to take from the rich and give to the poor?"

"It's not quite that simple. The do-gooders and the politicians take it from the producers and spend it either for nonessentials, for the benefit of a favored few, or for something that's downright competitive with the people who are ponying up the funds. And the worst part of it is they're always spending more than they take in."

"I think I'm beginning to get a glimmer of what you're talking about," said Don, the fourth member of our group. "They take from the young to give to the old; they take from the city folks to give to the farmers; in fact, they'll take from anybody they can and give it in places where they can get the most votes."

"This is developing into a pretty good gripe session," commented Bill. "If only the politicians would try to help those that produced the taxes a little. My blood pressure goes up every time I think about the attitude of the two California senators on the Trinity project. They are holding out for full federal development, which would entail selling the power to the California Valley Project at half what it cost to produce just so about 7% of the population of the state can enjoy subsidized power. If PG and E bought the falling water, it would pay the federal, state and local governments more than $300 million in revenues and taxes over the life of the project and the federal treasury wouldn't have to pony up the money to build the power houses and transmission lines either. The all-federal development makes Robin Hood look like a piker."

"There's another aspect to this," I interposed mildly. "Currently it's politically popular to bait bigness. Big steel, big business and all other big organizations seem to be fair game for the politician's scalpel when he goes out after more funds. The only trouble is that being big means that there are a lot of little people working together for a common objective.

"Actually it's the worker, the taxpayer, and the consumer that get bitten when Congress puts the bite on big business.

"I recently read a company report that indicates pretty well what I'm talking about. Last year one of our big oil companies paid taxes of all kinds of over $800 million. It paid import duties on oil of over $1 billion and it collected another half a billion dollars of consumer gas taxes, so that it paid the government in one form or another more than $2 1/3 billion. If my memory serves me right, that represents about 3% of the federal budget—all contributed by just one company. The point here is that these tax payments were more than double the amount of the pay roll, and they all came out of the hides of the ultimate customers."

"Well you'll never get the politicians to think about cutting taxes or curtailing spending. They spend most of their time figuring out ways and means of gouging some extra dollars out of the pay checks and the grocery lists."

This was from Fred who continued: "And when they can't get the dollars in from taxation they merely borrow against the earnings of our grandchildren. That is the greatest giveaway of all because the 52¢ dollars they borrow today will be paid back in 10¢ dollars a few years from now."

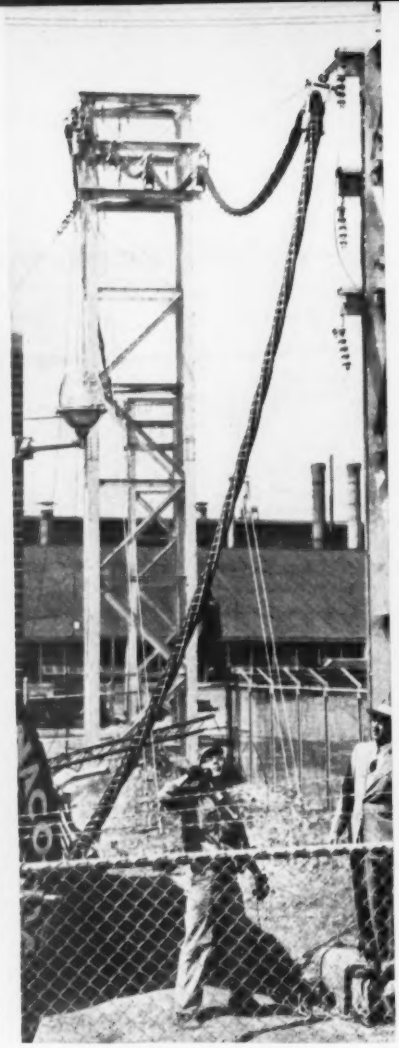
"You make it sound pretty grim," said Bill. "What's the answer anyway?"

"Obviously there's no pat answer or else someone would have thought of it already." Fred picked up the magazine he had been reading and leafed through the pages for a moment. "It says here that one way of easing the situation would be to insist that government projects used in the public interest pay their own way. The St. Lawrence Seaway is a case in point. It will be used largely by foreign vessels because most of the American merchant fleet is too large to negotiate its channels and locks. These same foreign vessels will be competing against taxpaying American railroads and truck lines. The seaway tolls should be such that the country realizes a full return on the investment including the equivalent taxation of similar facilities used for other forms of private commerce. There are literally hundreds of other government enterprises that are operated by taking money from the taxpayers to grant special privileges to a favored few. Maybe it all evens out in the long run but it also adds up to a big chunk of federal spending that could be done away with without seriously imperiling the comforts, necessities or security of the general populace."

"Ah, Fred, you're just jealous because you're not getting enough of the gravy." I looked around the table and grinned: "I'll tell you what, fellows, Fred would make a great Robin Hood himself. I move that we run him for assemblyman from Marin County next election. All those in favor say 'aye.'"

The motion was passed with one dissenting vote. Can you guess whose?

Quickly installed aerial cable. Here's an application where 600-volt Durasheath was quickly installed and easily terminated. Durasheath's neoprene jacket resists weather, abrasion, heat, fumes. Assured: dependable performance and long-range economy!

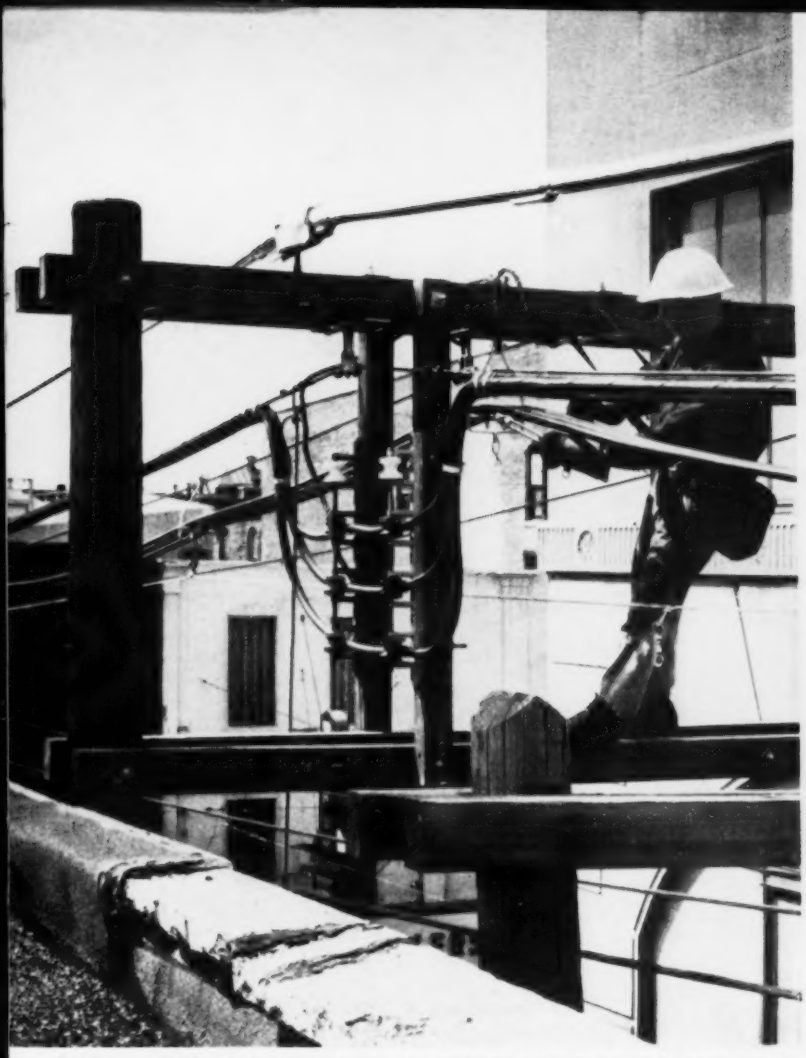


Factory-assembled aerial cable, made up of 3 single-conductor 15-kv Durasheath cables. Easy splicing, tapping and terminating meant simplified installation in the job shown here. No ducts, crossarms or insulators were needed. Wiring is neat, safe.

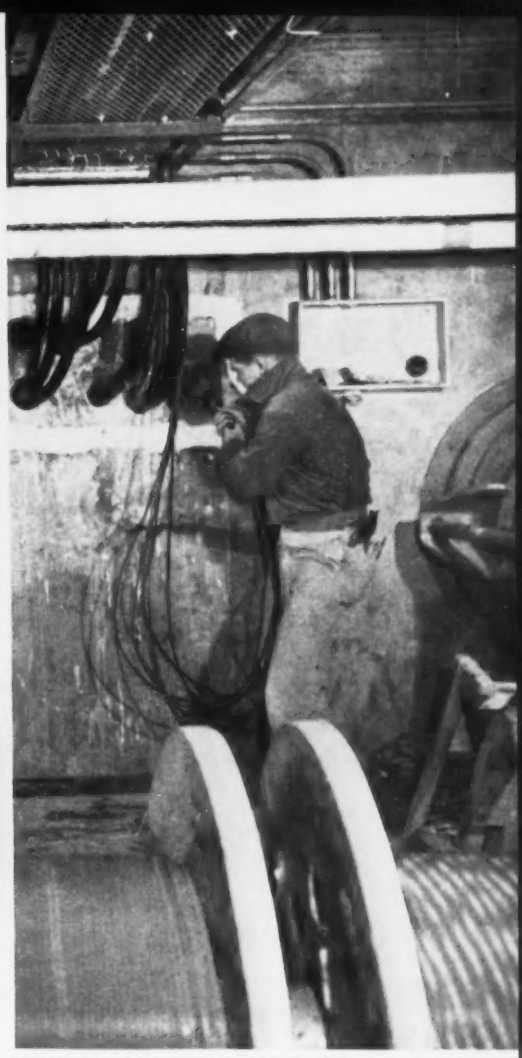
Direct-burial cable. The moisture-, oil-, and acid-resistance of Durasheath's jacket makes it the ideal cable for direct-in-the-ground applications like the one shown above. Its flexibility cuts installation time and cost because Durasheath is easy to handle. Its durability cuts maintenance costs!

Look at the ways you can save installation time and cost—with dependable Anaconda Durasheath Cable!

Wherever you want... whenever you want—this versatile power cable lets you install circuits fast... easily... at low cost! Use it aerially... in ducts... underground—in long runs with minimum splicing, indoors or out!



Field-assembled aerial cable. Versatile Anaconda Durasheath power cable was quickly field-assembled into aerial cable with the simple spinning operation shown here. Additional Durasheath was run along the building, grouped in a neat assembly by insulators and straps. It's another example of the way dependable Anaconda Durasheath adapts itself to your power cable needs—whether indoors, outdoors or both. Check into Anaconda Durasheath power cable for your wiring plans!



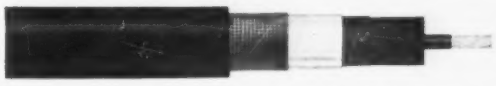
Installed in ducts. Durasheath's flexibility meant quick and easy installation here. And once installed, its tough neoprene jacket assures long, trouble-free life. Because Durasheath adapts itself to so many uses, your inventory problems are lessened—fewer cables need be carried in stock!

The installations shown above have one thing in common: they're all using Anaconda Durasheath* rubber-insulated neoprene-jacketed power cable —each for a different *kind* of application! Although the above photographs were taken at different installations, they could very well be pictures from one and the same job. Versatile Durasheath is a power cable that can be used to meet almost *any* installation need!

Such versatility in the use of Durasheath enables you to plan the most efficient layout for your wiring – then carry these plans through economically, with assurance of reliability. Talk to the Man from Anaconda about Durasheath. For full information, write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Trademark

58376 Rev.



ANACONDA DURASHEATH ALL-PURPOSE POWER CABLE
Available in all sizes, single and multiple conductor, copper or aluminum, 600 to 15,000 volts and higher.

Insulation. Type RHW, Anaconda ANW, Anaconda Butyl (AB) high-voltage or Anaconda Butyl (AHW) low-voltage rubber compound.

Jacket. Specially compounded neoprene with high resistance to flame, oil, acids, alkalies, sunlight and ozone. Has high tensile strength. Takes flexing at extremes of temperatures.

SEE THE MAN FROM

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FASTEST WESTERN SERVICE— At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application*. Anaconda assures the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

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supplied with 12,000 kva of electricity

Served by six Wagner Underground Network Transformers

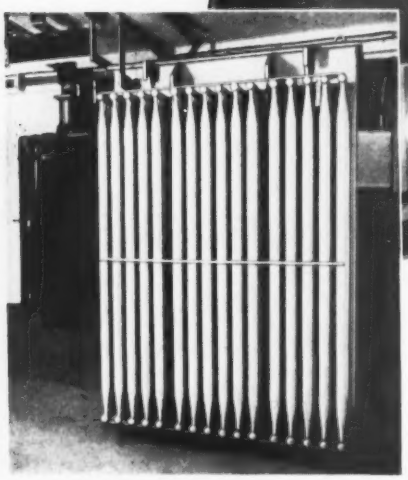
Transformers Dallas' fabulous new Southland Center consists of the 42-story Southland Life Tower, tallest building west of the Mississippi, and the 600-room Sheraton-Dallas Hotel. A "City within a City," the Southland Center is an enormous consumer of electric power. For example, there is a 6,450 ton electrically-driven air conditioning system—fourth largest in the world!

Dallas Power and Light Company, who supplies this power, has installed six 2,000 kva underground network transformers in the basement of the building to assure continuous electrical service to the Center. The transformers were supplied by Wagner.

Wagner Network Transformers are built for installations of this type. They have a low noise level . . . they are small in size to fit in close quarters, and now have a compact switch and panel radiators for smoother contour and easier maintenance.

Wagner makes a complete range of transformers for industrial and power company needs. Consult your nearby Wagner Sales Engineer about your power distribution program. There are Wagner branches in 32 principal cities.

Southland Center has 296 miles of electrical wiring . . . 15,800 lighting fixtures . . . 28 elevators . . . 8 escalators and an all-electric company cafeteria.



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ELECTRICAL WEST VOL. 122, NO. 6 JUNE 1959

Aloha Hawaii — Our 50th State

HAWAII is no newcomer as a force in the Western electrical industry. Nonetheless its mainland neighbors are proud and happy that Hawaii at last has been accorded statehood and becomes the 13th state in the great and growing West. All with a spark of romanticism in their makeup dream of visiting the Paradise of the Pacific. Those fortunate ones who have seen Diamond Head loom up over the horizon or slide past under the wing on their way to enjoy the traditional ceremonies attending a visitor's arrival know all too well the enchanting scenery and the gracious hospitality that characterizes this newest member of the union. The visitor finds it very easy to be submerged in the charm and beauty of his surroundings. All too few look behind the scenes to see the economic underpinning of this island wonderland.

Our newest state consists of five major islands and three smaller ones, having a land area of 6,435 sq mi. This is slightly larger than the combined area of Connecticut and Rhode Island. Its population, however, totaling 644,025, is greater than that of six other states (Alaska, Delaware, Nevada, New Hampshire, Vermont and Wyoming). In racial origin 32% of the citizens are Japanese, 17% Hawaiian or part Hawaiian, 11% Filipino, 6% Chinese, 4% of other races and 30% Caucasian.

Contrasts Abound

Despite the oriental background of much of the population, island communities are decidedly modern and possess the most up-to-date electric power, banking, transport, highway, telephone and television systems together with excellent newspapers, well-organized shopping centers and modern homes adapted to Hawaii's unparalleled climate.

Yet contrast abounds at the crossroads of the Pacific. Famous Honolulu on Oahu is the ultramodern metropolis of the new state. Twenty minutes away by air is the small island of Niihau where the natives retain the age-old Hawaiian way of life with almost fanatical fervor. White men are not allowed to stay on this island overnight.

An hour's plane ride from Waikiki Beach lies Mauna Loa, the 13,680-ft active volcano on Hawaii, the large island. The bustling efficiency of Pearl Harbor, one of the country's major military outposts, is contrasted with the jungle rain forest on Kauai, only a few miles to the northwest.

Economically, the rural calm of sugar and pineapple plantations contrast with the whine of jet airliners that bring Honolulu to within five hours of San Francisco. Yet agriculture and tourism are two of the main props to the economy.

In 1900 Hawaii became a territory of the United States. At that time an overwhelming majority of the island residents was dependent upon agriculture, primarily sugar production, for employment and income. In the first third of this century, sugar continued to become an increasingly important crop and pineapple production was introduced on a commercial scale. Sugar is grown on all of the major islands and pineapple on all except Hawaii. However, plantation operations have become progressively more highly mechanized so that since the middle

The famous Aloha Tower, landmark of Honolulu harbor, furnishes the background for the traditional welcome to island visitors arriving by sea. In the foreground are the Leslie A. Hicks and Harbor steam plants of the Hawaiian Electric Co. The former was completed in 1957 and has a total capacity of 115,000 kw. Fuel oil must be imported from mainland sources

1930s there has been a gradual decrease in population of Hawaii, Kauai and Maui as workers migrated to Oahu for employment. There, centered around Honolulu, a modern metropolitan city has developed alongside of the country's largest defense outpost in the West.

Economic Factors

Defense Department activities constitute the largest single source of gross revenue for the new state, totaling well over $300 million annually. Sugar and pineapple contribute about a quarter of a billion dollars annually; construction totals about $190 million annually with other manufacturing and tourism each contributing approximately $100 million a year.

There is considerable diversified agriculture, including a well-developed coffee-producing industry—our only state producing coffee commercially. Even so a great proportion of staple foods must be imported from the mainland or other sources.

As a state Hawaii has some unique problems. It is basically dependent on sea transportation to provide most of the materials of modern civilization, such as fuel, lumber, machinery, construction materials and all of the other items that make up modern living. Local government is divided into four counties, each of the major islands of Kauai, Oahu and Hawaii being a county with a fourth made up of Maui, Molokai and Lanai. Major commerce between the counties also is by sea, although passenger traffic between the islands is 100% by air.

The new state is faced with the difficulty of providing nonagricultural jobs for its rapidly growing population. This, too, constitutes somewhat of a dilemma as industrial growth to provide jobs on one hand could detract from scenic beauty which is the principal attraction of another great industry, tourism. At the present time nearly four-fifths of the population is concentrated on Oahu which has less than one-tenth of the land area of the new state.

Bright Future Ahead

Looking to the future, leaders in Hawaii look toward the opportunities of the Jet Age which will make the new state a still more important communications crossroad. They envision an expanding agriculture but one based on the development of tropical fruit products for mainland markets. They anticipate that tourism is likely to become the major island industry within 10 years and even dream about a well-developed "retire-in-Hawaii" program that might be a significant factor in the future economy.

Because of its climatic and scenic resources, its geographical position and its well-established trade relationships with the mainland, the newest state may well look to the future with confidence. Again we say, Aloha Hawaii.

Supplying Power to the Island State

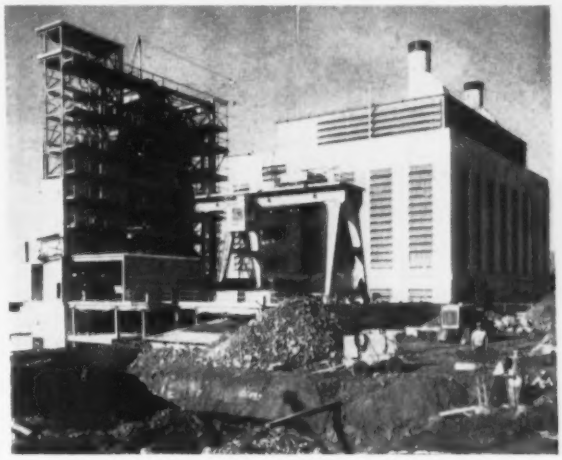
With the exception of Oahu, the power requirements of the islands are largely dictated by the demands of the sugar and pineapple plantations. Each island must be self-sufficient in so far as generating capacity is concerned because there are no practical means of interconnection across the many miles of ocean that separate them. There are no fossil fuel reserves of any type and only a few of the streams in the mountainous terrain provide reliable hydro power in any quantity. As all fuel must be imported, oil is the dominant basic source of power for steam and diesel plants. On the windward (Northeast) side of the islands heavy salt spray contamination is a problem for the transmission and distribution engineer. Tropical, even jungle, conditions in some areas complicate the tree clearance problem and maintenance of right-of-way. On the other hand, civic pride in the scenic beauty of the islands confronts transmission and distribution engineers with major problems on the appearance of electrical facilities.

Power systems themselves vary in size and composition. With the exception of Oahu all are generally closely allied with the plantation companies whose mill requirements dictated the establishment of the island's initial power supply.

million people with over a billion kw of energy annually.

Electricity first came to Honolulu in a dramatic blaze of arc lamps at Iolani Palace of King Kalakaua in 1886. Five electric arc lamps were strung in the palace gardens to honor the king's 50th birthday. Five years later the Hawaiian Electric Co. was incorporated with a total capitalization of $20,000. Today the company has a plant investment of more than $95 million with three major power plants totaling 340,000 kw, plus a 60,000-kw addition under construction. Power is served to all island communities and plantations over a 46-kv transmission system and 11-kv distribution lines. Population growth on the windward side now requires the construction of the state's first 138-kv transmission line which is being constructed across the mountain range and will be in service late this year, although operating initially at 46 kv.

The company has been an active proponent of electrical living with the result that the average residential customer uses about 4,400 kwh annually—well above the average of the mainland.

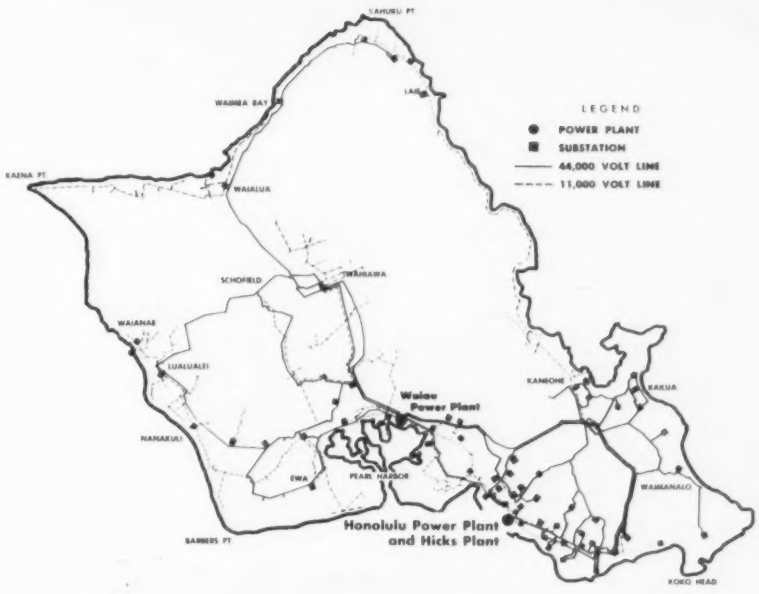


This is Hawaiian Electric's Waiau power plant at Pearl Harbor showing the construction of the first outdoor-type generating unit to be placed in operation in the islands. This 60,000-kw addition is expected to be in operation late this year. Below—map of the island of Oahu showing the location of the principal electrical facilities

Oahu

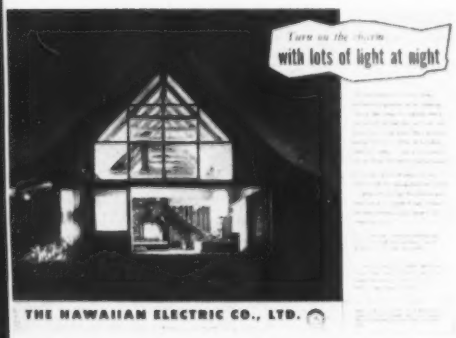
Oahu, the principal island in the Hawaiian chain, includes the capital city of Honolulu and such other world-famous places as Pearl Harbor and Waikiki Beach. The island is roughly 40 miles long and about 26 miles at its widest point but is bisected by a sharp mountain range running generally from the southeast to the northwest. While metropolitan Honolulu and Pearl Harbor dominate the leeward side, there are large sugar and pineapple plantations in the north central area and the press of population growth is resulting in the development of a number of modern communities in the windward (northeast) side of the island.

The Hawaiian Electric Co., largest of the island utilities, has more than kept pace with the accelerated population growth and electrical demands of the island. It serves nearly half a



PRINCIPAL FACILITIES
OF
THE HAWAIIAN ELECTRIC COMPANY, LIMITED

Hawaii's marvelous climate is conducive to outdoor living. Aggressive promotional efforts have encouraged residents to live better electrically with patio lighting and garden effects prominent in enhancing the charm and beauty of the tropical center of most residences. Below, left, are examples of promotional efforts that have helped raise the average residential consumption of electricity more than one-third above that of the national average on the mainland. Good advertising, shows and expositions, and electric cookery demonstrations are important facets of Hawaiian Electric's loadbuilding program



The company's progressive policy has established its reputation as a progressive corporate citizen. It has played a leading role in the island's industrial development and it has been particularly careful to arrange its facilities to preserve the natural beauty of the island. Transmission lines are run in forest reserves away from populated areas; many substations are beautifully and artistically concealed by careful landscaping (see cover); underground is used extensively both in downtown Honolulu where a conventional network is installed and in residential tracts where cooperation with builders has resulted in many areas free from overhead lines. Where underground service is not financially feasible, the number of poles has been minimized. To preserve the natural beauty of the trees and minimize tree trimming, aluminum secondary cables on a messenger with midspan taps for service are used for the secondary distribution system. Where it is unavoidable to install transmission circuits within city sections, they are placed underground, using 44-kv low-pressure gas-filled cables.

The company also has been the leader in the development of the entire electrical industry on Oahu and in the neighboring islands. It has spearheaded promotional campaigns and fostered intra-industry efforts, particularly through its association with the Pacific Coast Electrical Assn. In 1951 the first PCEA Hawaiian conference was organized. Since that time Hawaiian conferences have been held biennially in the odd numbered years. This year the conference will be held Nov. 5 and 6 in Honolulu.

There are nine full line appliance distributors and 13 limited distributors in Honolulu. Inventory control, not only for appliances, but all other electrical supplies, is a greater problem than on the mainland because all merchandise is shipped by freighter either from San Francisco or Los Angeles.

There is a total of 128 electrical appliance dealers on Oahu and about 78% of all appliance sales are made on that island. The utility maintains contact with these dealers and assists them in realizing the maximum in sales volume through industry-wide promotional campaigns and other assistance. The Medallion Home program was adopted in 1958. During that year 78% of all individual dwellings constructed on Oahu were all-electric.

The interior of the mill power house of the Lihue Plantation Co. having a total capability of 11,000 kw. Irrigation and power requirements of the sugar and pineapple plantations require many such installations, which also provide power to island utility systems. During sugar cane harvesting seasons, begasse, the cane residue, is used for fuel—at other times imported oil is burned. Salt spray contamination and fast-growing tropical vegetation are hazards for transmission and distribution lines. Circuit of Wainhi Electric Co. on Kauai (above) parallels a row of coconut palms whose fronds must be trimmed regularly to avoid interference

Kauai

On Kauai, the garden island, the Waiahi Electric Co. Ltd. is a wholly owned subsidiary of the Lihue Plantation Co. Ltd. The company has a diesel generating unit of 1,200-kva capacity but purchases nearly all its power from the plantation company whose electrical system is tied in with all sizable generating plants on the island. Lihue Plantation Co. has a steam generating capacity of 11,000 kw and supplies power to the Kekaha Sugar Co. and to the McBryde Sugar Co.

The latter company owns the Kauai Electric Co., which initially built the Wainiha hydro plant, having a capacity of 4,500 kva. The company also operates another hydro plant of 1,250 kva, as well as a steam generating plant at its mill with a total capacity of 4,375 kva.

Much of the energy used on the island is for irrigation, pumping and mill power. On this predominantly agricultural island, the average residential use is 2,175 kwh per year at an average revenue of 1.66¢ per kwh.

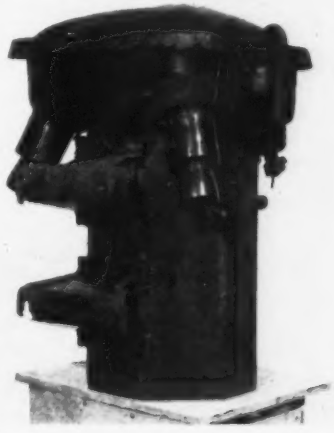
Kauai experiences some of the heaviest annual rainfall of any place in the world. Water cannot be stored, however, because the decomposed lava of its soil is so porous.

Because of the heavy rainfall, heavy tropical growth is a problem for transmission line constructors and operators.

Major tie lines between the various areas on the island are rated at 57.1 kv with distribution at 11,500 and 2,300, 4,150 and 6,900 v.

Studies are now being made to determine the size and location of the next generating unit that will be required to meet the load growth on the island.

Kauai also looks forward to growth as its tourists attractions are many, and it is only a few minutes flight from Honolulu. Its mountain and tropical scenic attractions are world famous as is the Barking Sands beach on the western shore of the island. Agriculture in its various forms, however, probably will dominate the economy of the island for many years to come.



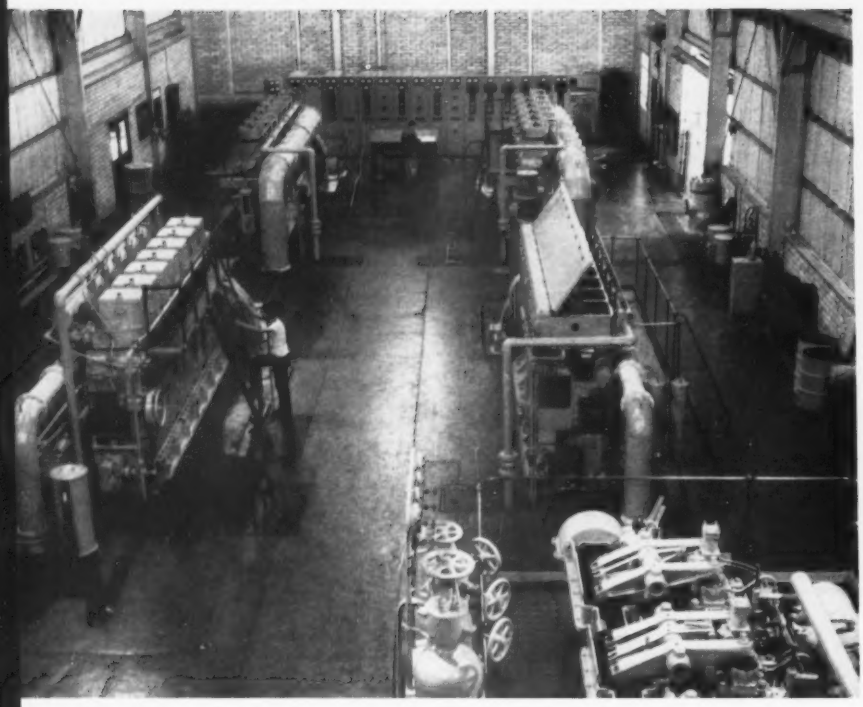
Distribution engineers' nightmare. This transformer has been exposed to the salt spray conditions experienced on Maui

Maui

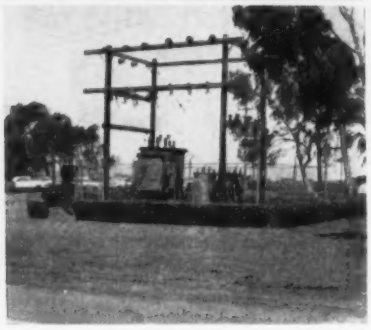
Maui County comprises the three islands of Maui, Molokai and Lanai. The Maui Electric Co. Ltd. serves the central part of that island as well as operating the distribution system on Lanai. This company operates three steam-turbine generators for a total capacity of 21,500 kw. It serves 10,484 customers and is interconnected with the Lahaina Light & Power Co. Ltd., a wholly owned subsidiary of the Pioneer Mill Co. The latter company operates in the western area of Maui. This interconnection is of interest because the 4,750-kva steam-electric generating plant of the Pioneer Mill Co. uses bagasse (the residue from sugar cane after the juice has been extracted) as a principal fuel, which is occasionally supplemented by bunker C oil. During the cane harvesting season a favorable sale of power to the Maui Electric Co. is possible. At other periods of the year the plantation sometimes finds it economical to purchase power from the Maui Electric Co.

In both sugar cane and pineapple production, irrigation is required and much of the distribution systems is determined by the location of irrigation pump loads. A similar interchange of power is also provided between the Maui Electric Co. and the Hawaiian Commercial & Sugar Co.

On Maui, the valley island, the prevailing northeasterly trade winds constantly deposit heavy salt contam-



Interior view of the Dole Hawaiian Pineapple Co. power house at Lanai City on the island of that name. Power produced by these diesel-electric units is distributed by the Maui Electric Co., which purchased the distribution system on the island



Above—George A. Will, vice-president and general manager, and Henry Yamashira, vice-president and assistant manager, stand in front of the Molokai Electric Co.'s offices. Below is a regulating substation

ination on about 60% of the system, nearly all of the balance receiving a medium or light contamination. For example, 22-kv lines (carried on 66-kv insulators) have to be washed twice a week in the vicinity of the main power plant at Wailuku.

Major connections are at 69 kv with a prevailing voltage of 7.2/12-kv Y distribution lines.

While Maui has been basically an agricultural island, the Pioneer Mill Co. has plans for a 2,000-room hotel on one of the finest beach frontages in the new state. Another group plans a similar tourist center. These, together with the associated stores, shops and similar enterprises, augur rapid growth in power demand on the island.

Line truck of the Lahaina Light & Power Co. on Maui installs a distribution circuit

Lanai

On Lanai, the pineapple island, power is generated in the Dole Hawaiian Pineapple plant where six diesel units provide a total capacity of 2,700 kw. The distribution system on the island was purchased by Maui Electric Co. in 1954 and has since operated the system. The distribution company sells power to Dole for use in its shops and offices but the pineapple company independently supplies the power needs for irrigating its vast pineapple fields.

Most of the 2,300 people in Lanai City are pineapple company employees and most own their own homes. Electricity is used increasingly for cooking, refrigeration and electric freezers, which are popular because of the wild game and abundant fish that are available on the island itself and in its surrounding waters.

Here in this rather remote colony, TV has been a boon both as an entertainment and educational medium.

Molokai

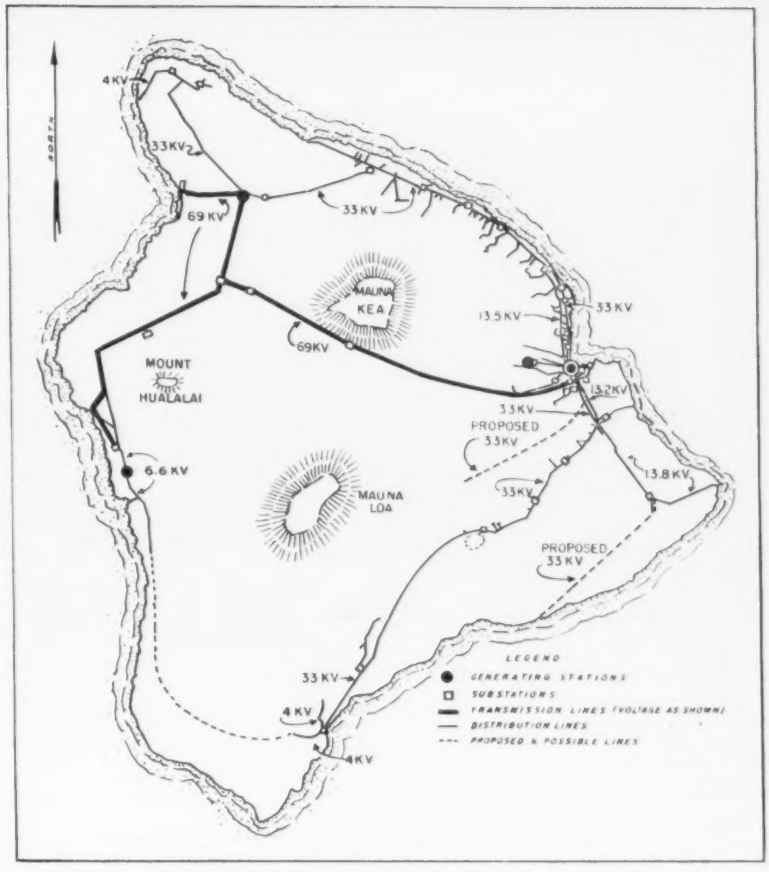
The Molokai Electric Co. Ltd. is another island utility that is young by most standards. The company was incorporated in 1932 to serve about 500 people in the village of Kaunakakai. At the present time it now serves about 98% of the island residential and commercial accounts, totaling 1,379 customers. Included in its customers are the California Packing Corp.'s pineapple plantation and the Libby, McNeill & Libby pineapple plantation. The power plant consists of seven diesel generating units, having a total plant capacity of 3,550 kw connected to a 60-mile, 12,000-v transmission system.

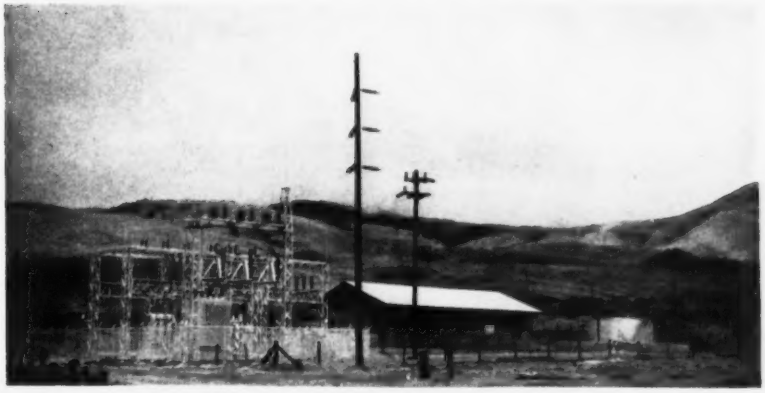
Hawaii

On Hawaii, the big island, the Hilo Electric Light Co. Ltd. is the dominant electric utility. This company has a total generating capacity of 34,525 kw, of which 23,425 kw are in steam turbines, 3,350 kw in hydroelectric units and 7,750 kw in diesel engines. The total customers served is 18,446.

The company has a 69-kv transmission system extending from Hilo on the east to a connection with Kona Light & Power Co. on the west as well as 33-kv transmission lines extending north along the east coast and south across the shoulders of Mauna Loa to the southern area of the island. Total transmission mileage is 252 with nearly 500 miles of associated 2.4- and 13.8-kv distribution circuits. A 51-mile gap between Kona on the west coast and the termination of the southern line is the only break in a complete transmission loop around the island. Interconnections are made with several large sugar plantations that have local sources of generating capacity.

Helco's contribution to the community includes sponsorship and support of educational and cultural activities on the island. It holds regular free cooking schools and instructs customers on the use and maintenance of appliances and equipment.





The company employs 170 people who have an average length of employment of 15 years. Its plant investment account now totals over $15,000,000, a 308% increase in 11 years.

The island offers much for the tourist. The tropical serenity of the Kona coast, the black sand beaches along its southern waters and smoking craters of its active volcano, Mauna Loa, all present new opportunities for a "different" vacation. These attractions presage an influx of visitors and tourists from the mainland with the attendant growth in the economy. In fact, the company has its own "10-year-plan" to meet anticipated growth in electrical demands resulting from the prospective increase in tourist traffic.

Above, left—The Waiakea steam generating plant of the Hilo Electric Co. at Hilo, Hawaii. This plant contains four units having a total capacity of 23,425 kw. Below—Another installation of the Hilo utility, a diesel generating plant and substation having three 1,000-kw diesel units at the northern end of the island.

Prof. Gray
Cal Tech

Fox
B. C. Electric

Brunzell
WWP

Shevalier
Montana Power

Here are the new ideas that evolved as engineers from . . .

RMEL, NELPA Plan for Tomorrow

In Business and Politics

OPENING the NELPA meeting George Gadsby, chairman of the board of Utah Power & Light, stated flatly that the plans for the future rest squarely on the shoulders of engineers. He said that in his opinion system plans 10 to 12 years ahead are an absolute necessity. He indicated his convictions that an honest look this far ahead would point up the necessity to integrate the privately owned power systems with strong transmission ties.

Dix Shevalier, Montana Power Co., encouraged engineering and operating peoples to take an active part in community, state and national politics. "We can't be critical of that which happens when we leave our policy making to others. We can't protect our interests by staying away."

George Brunzell, Washington Water Power, discussing our political future, told the group that we are a two-party system and that we had better find capable people in both parties who appreciate and understand our problems if we want to enjoy continuing freedom through party changes. He pointed out that a five per cent increase in sales was nearly five times as profitable as a five per cent reduction in cost. In view of this, engineers who have a proved efficiency in cost reduction are going to have to take more of a "can-do" attitude in implementing sales programs.

Meeting head on the problem of peace with Russia, O. C. Tanner asserted that a new American patriotism built on faith that we can live with the Russians is necessary. This is one of the few situations in the affairs of men where faith and a will to get along can change the fact. Resignation to eventual armed conflict rules out the climate of thought which can prevent world oblivion. Other recommendations to further peace:

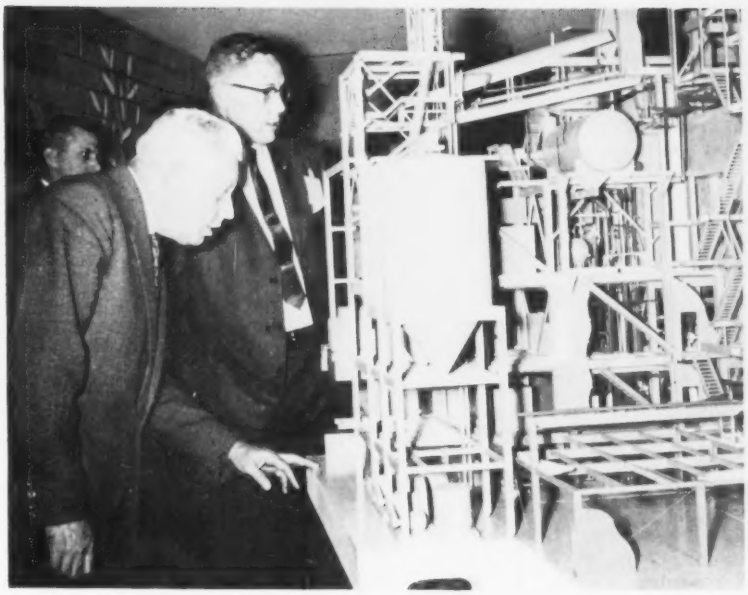
1. Trade with the Russians.
2. Seize every opportunity to communicate with the Russian people.
3. Educate our people so that the cultural background for understanding exists.
4. Work to strengthen the U. N. organization.

On a subject dear to all, "compensation of engineers," Prof. R. D. Gray, California Institute of Technology, gave some time-tested observations. First of all we must understand that no one can be entirely logical or unemotional on the subject of his pay and, secondly, everyone wants more money. He lambasted the feeble attempts to keep general salary levels secret. He pointed out that salaries of most company officers are published, as well as the pay scales for union employees. He recommended that salary brackets for a given job could be

revealed without doing any harm.

The most important thing to watch in setting salaries are the internal relationships — rather than how well a given job pays in another industry or in another company.

"Following a trend curve is a dangerous and sometimes misleading pastime, but at least it gives us a possible destination from which we can better evaluate today's plans," stated Jack Robinson, engineering editor of ELECTRICAL WEST. If the present rate of population and corresponding electrical growth continue, the eight Mountain states will see an increase in electrical capacity equal to the present total capacity of the thirteen Western states. These are the dimensions of our potential growth by 1975. Engineers have an obligation to go beyond building power facilities and to provide for this growth. Since they know better than any other group the impact of technology upon our present way of life, it goes without saying that they must carry this special knowledge into community planning.



Robertson Colo. PS **Lewis** R. L. Lewis Co.

In Generation—Automatic Operation, Coal Generation Key Interests

The generation man's accelerating interest in automatic operation was greatly enhanced by a fine basic paper by T. D. Stanley of Calgary Power Ltd. and G. F. Green of the B. C. Electric Co. Ltd. entitled "Economics of Centralized Control of Electric Generating Plants."

Looking at the cost of manual operation they stated "each operating position requires 168 hours of attendance per week. On the basis of a 40-hour week this necessitates the requirement of four to five men at an annual cost ranging from $23,200 to $40,000. Capitalizing this at 12½%, we arrive at a figure between $185,500 and $320,000. Stating this in another way, it would be economical to make a capital expenditure of at least $185,600 to save one operating position."

Supporting their contention that automatic remotely controlled hydro plants are economic, a complete breakdown of automatic, supervisory and channel costs was presented for the hydro system of the Calgary Power Ltd. Concluding they stated: ". . . the total capital cost of the remote and supervisory control on the Calgary Power hydro system is $818,500, and a saving of 40 men has been achieved. Based on 1957 wage rates, the cost per man, including fringe benefits and housing, is $7,920 per year. As the saving in manpower has amounted to 40 men, this makes a total saving of $316,800 per year. The annual fixed charges on the capital required, based on 12½%, is $102,300. This makes a net saving of $214,500."

In a similar vein T. R. Heikes, Idaho Power Co., reported on the remote control plan for his company's Oxbow power plant, which when completed will be controlled from the Brownlee plant 12 miles up stream. He pointed out that, during the initial operation phase, one combination turbine and switchboard operator will be maintained at the Oxbow plant, with this schedule to be reduced or eliminated in the future. The remote control operation will consist of:

1. Automatic control and synchronizing.
2. Supervisory control over microwave.
3. Indication of operating conditions over closed-circuit television transmitted by microwave.

Looking to the application of automatic control to steam plants, A. L. Danielsen, Bailey Meter Co. pointed to the savings that should come about through the use of performance monitoring equipment.

R. C. Prater, PS of Colorado, discussed the availability of fuels in

Charlie Cutter and friends . . .

the Rocky Mountain area. He pointed to the fact that nearly half of the nation's coal reserves lie in the mountain area—enough to supply the entire country's electrical demands for almost a thousand years. He said that mine operators were going to have to look at mine mouth costs in the light of radically increased production on a steadier base. Much evaluation is needed in the area of transportation. Whether long transmission lines with mine mouth steam stations is the answer, or whether rail, truck or pipe-line transportation of fuel makes more sense, is something that has to be carefully studied. The utility companies on the other hand can make better uses of the fuel with properly designed plants particularly with regard to smoke abatement and ash disposal.

A final recommendation is that utility planners keep close watch on new developments such as coal gasification, carbonization of coal as well as the long talked of oil shale development so that full use of fuel resources can be achieved.

In Transmission—650-Kv by 1975

General Electric's volatile Pier Abetti, patron saint of "Project EHV," described the planning behind his company's studies of extra-high-voltage transmission. Admitting that it would be possible to carry the loads of the immediate future at 220 kv, the problem of obtaining rights-of-way will drive voltages upward to 460 kv by 1964 and to 650 kv by 1975. Beyond this time Abetti says extra high voltage d-c transmission may enter the picture. The goal of Project EHV, according to Abetti, is to gain operating experience with actual power system components as soon as possible. By recording all of the factors affecting high-voltage transmission including such obtuse items as dust count in the air and analyzing these data with high power computers, Abetti hopes to obtain information on the performance of EHV systems. According to Abetti, model testing of tower structures is yielding valuable information that will be tested shortly in the field.

In Distribution—Higher Distribution Voltages, Residential Underground Dominate Meetings

The increasing propensity for Westerners to demand underground electric service as part of the better life was treated in detail at the RMEL meeting. In addition to a trio of speakers from the area the group had foresight to invite Carter Blankenburg of Southern California Edison to bring views from outside the area regarding underground service. In introduction, Blankenburg likened residential underground to indoor plumbing. "Sure it costs more money but people want it and they are willing to pay for it."

Blankenburg went on to state that, regardless of the many variables, he had found $10 to $12 per foot of main trench the best way for determining the over-all track cost. He continued by pointing out the advantages of using standard drawing for construction details so that an accurate scale plot might be the only special drawings for a given job. He described in detail his company's approach to residential underground giving cost breakdown for major components. He indicated a per lot cost of $400 to $500 for semivaried transformer construction and $800 to $1,000 for complete underground systems.

Stanley Case of the Fort Collins Light & Power described his organization's experience with underground dating back to 1946. Case set forth seven standards that have been developed for cooperation between the subdividers, the telephone company and the power utility. He continued: "adopting these standards has permitted us to advise the subdivider in advance that his added cost for an underground installation will be $35 per lot payable to the power company upon completion of the underground distribution system for any predetermined portion of the subdivision."

Ralph Stewart, with the consulting firm of Miner & Miner, developed the probable load that today's underground systems will have to serve in 30 years. He pointed out that a knowledge of future loads is more essential in underground than overhead work since changes are much more costly. He discussed the relative merits of installing the ultimate cable now versus a change out at some future date.

H. M. Woehler from the city of Colorado Springs discussed his approach to underground, and indicated the various installed costs of major components. On a typical development his approach yielded an additional cost per lot of $251 which would have been reduced to $167 if the property had lent itself to a more advantageous electrical layout.

The wide spread in per lot cost for underground coupled with the frank disclosure of all the costs involved stimulated some very healthy

Beck
Peterson Co.

Fuller
Colo. Central Pr.

Thurstin
Hank Thurstin Co.

Eaton
Anaconda

Wilson
Colo. Central Pr.

Smith
Colo. Central Pr.

discussions. Everyone involved felt that the underground workshop had given them new ideas.

Don Haasch, Idaho Power Co., whose company has been a leader in the development of 20/34.5-kv distribution primary voltage, likened the present-day trend to that which took place in the 30s when the industry began to change over from 4 kv to 12 kv. The advisiability of a change-over today is much clearer when viewed in terms of tomorrow's loads, two to four times greater than those of today.

Of real importance to today's substation planner is the fact that a 20/34.5-kv sub can be located seven and a half times as far from a load center as a 12-kv sub and still be electrically equidistant.

Pacific Telephone Co.'s C. W. Lund stated that telephone co-existence with the new higher distribution voltages was certainly possible. He indicated that noise to date had not been a problem because apparatus manufacturers have held harmonic generation to a minimum.

Looking at the higher distribution voltages from the manufacturer's viewpoint, Line Material Industry's G. W. Cooper discussed the development of equipment and BIL recommendations for the new voltage. He indicated that a 27-kv arrester and 150-kv BIL appeared to be optimum.

B. H. Mullen of Westinghouse Electric Corp. encouraged the utilities to recognize the full potentialities of their distribution transformers and make maximum economic use of their capacity. He said that economics demand that transformer applications be carefully controlled and continually studied to achieve full use. He surveyed some of the more popular means of determining transformer loading. He indicated that today's business machines present an opportunity to convert kilowatt-hours to kw demands provided that factors can be developed that will make the conversion realistically. Meanwhile, signal lights on self-protected transformers or similar indicating devices offer a sure and inexpensive means of determining abnormal load conditions.

In a similar vein, General Electric Co.'s J. A. Smith discussed the effect of power transformer overloading on the remainder of the substations. His talk covered planning design and in particular the effect of overloads on station switchgear.

Many ideas were exchanged at after hours sessions like this one on electronics

In Communication—TV Telemetering, Microwave Power Supplies, Radio Alarm Signal Systems

Ken Timm, Idaho Power Co., reported on the economics of providing TV telemetering and remote control of the Oxbow hydro project via microwave channels. Eighteen quantities will be telemetered from Oxbow with an accuracy unmatched by any other system. In addition, the telemetering job will be done at a small fraction of the cost of a conventional system. In order to transmit TV on a single microwave channel a special slow scan system has been developed utilizing a high persistive tube.

William Haynes of D. W. Oman & Sons reported on two power supply systems on microwave stations. The first, an emergency system battery powered to supply power, has no moving parts and would be used while the primary power supply was being put back in service. A second system utilized three separate diesel drives for a generator. Each drive being a separate and distinct system would appear to give sufficient reliability to the power source for completely remote operations. As one communications engineer quipped, "if this system proves out, I will be tempted to put my repeater stations where they ought to be." In another report on radio alarm signaling systems, John C. Slothower of the NCUR indicated that a docket was presently under discussion that would expand the present application to two-way signaling—a new vista for remote control.

Millen
Colo. PS

Beier
Colo. Central Pr.

Huntsman
Colo. PS

Kelly
G-E

Blasing
Colo. Springs

Moninger
Colo. PS

Jeane Faulkner, Al Krieg
NELPA

Jim McDonald
Line Material

Wollaston
B. C. Engineering

Hosea
WWP

Horton
Copco

Evans
Montana Power

Compendium of E&O Program Speakers

RMEL

Factors Influencing Future Load Growth in the Regional Electric Utility Industry, Jack Robinson, Electrical West.

Visual Aids to Operator Training, J. Coleman Jones, Pacific Power & Light Co.; Dan J. McQuaid, Air-Vu Co.; Dr. L. M. Robertson, Public Service Co. of Colorado.

Power Generation

Application Trends in Power Plant Motors, Richard Potts, Allis-Chalmers Mfg. Co.

Coal Mining for Dave Johnston Plant, Elmer L. Bayles, Pacific Power & Light Co.

Data Logging and Automatic Control of Power Plants, A. L. Danielsen, Bailey Meter Co.

Design Features of Cameo No. 2 Unit, W. Otto, Fluor Corp.; C. Waselkow, Public Service Co. of Colorado.

Fossil Fuels in the Rocky Mountain Area, R. C. Prater, Public Service Co. of Colorado.

Steam Temperature Control of Utility-Type Boilers, C. L. Richards, Combustion Engineering Co.

The Marley-Mouchel Hyperbolic Natural Draft Cooling Tower, J. O. Kadel, Marley Co.

Transmission & Distribution

Comparison of Distribution Secondaries, Robert L. Tilson, Public Service Co. of Colorado.

Distribution Transformer Load Management, D. H. Mullen, Westinghouse Electric Corp.

Effect of Transformer Overloading Practices on Substation Design, J. A. Smith, General Electric Co.

Installing Capacitors Improves 13-kv Voltage, Robert L. Wardlow, Public Service Co. of Colorado.

Residential Underground Construction Technique, R. C. Blankenburg, Southern California Edison Co.

Residential Underground Systems, Stanley Case, city of Ft. Collins, Electric department; R. L. Stewart, Miner & Miner Consulting Engineers; H. M. Woehler, city of Colorado Springs, Electric department.

NELPA

General

Down the Road to Wherell, E. M. Naughton, Utah Power & Light Co.

The Problem of Peace with Russia, Obert C. Tanner, O. C. Tanner Co.

Compensation of Engineers, Prof. R. D. Gray, California Institute of Technology.

Electrical Equipment

Are Grounding Type Disconnects Switches Essential and Does the Benefit Offset the Hazard, J. T. Evans, Montana Power Co.

Development and Application of High-Voltage Air-Blast Circuit Breakers, R. B. Shores, General Electric Co.

The Electrical Features of the B. C. Electric Co. Gas Turbine Plant, F. O. Wollaston, B. C. Engineering Co.

Experience With an Oscillograph on a Transmission System, L. S. Horton, California Oregon Power Co.

Overload Capabilities of Major Electrical Equipment, R. C. Birkes, Pacific Power & Light Co.

Present Practice and New Concepts in Use of Digital Computers for System Planning, J. K. Dillard, Westinghouse Electric Corp.

Selection of Station Battery and Their Operation and Maintenance, A. D. Morris, Portland General Electric Co.

Standardization of Outdoor Substation Design, Noel Hosea, Washington Water Power Co.

Electronics

Closed Circuit Television for Power Utilities, Ken Timm, Idaho Power Co.

Noninterruptible Power Source for Radio and Microwave Stations Installed Remote from Commercial Power, William Haynes, D. W. Onan & Sons.

Radio Alarm Signaling Systems

Report from the National Committee for Utilities Radio, John C. Slothower, National Committee for Utilities Radio.

Role of Communications in an Electric Utility, John C. Slothower, Northern States Power Co.

What Radio and Electronic Equipment Can Do for You, Robert Peth, Motorola Corp.

Meters, Codes & Services

Recent Sample Meter Testing Developments, Roy Crosby, Washington Power Co.

Statistical Methods as a Tool for Utility and Manufacturer, Floyd H. Busch, General Electric Co.

Training of Meter and Relay Men, E. W. Elford, Portland General Electric Co.

Power Production

Economics of Centralized Control of Electrical Generating Plants, G. F. Green, B. C. Electric Co.; T. D. Stanley, Calgary Power Ltd.

Experience With the Fish Facilities in Hells Canyon, H. R. Moore, Idaho Power Co.

Features of Remote Control System Used to Operate Idaho Power Company's Oxbow Plant from Brownlee Plant, T. R. Heikes, Idaho Power Co.

Problem of Power Restoration Following Complete Power System Failure, R. L. Wetherell, Washington Water Power Co.

Transmission and Distribution

Problems of Joint Use—Voltages Above 15-kv, C. R. Leever, Pacific Power & Light Co.; C. W. Lund, Pacific Telephone.

Progress in EHV Transmission and Project EHV, Dr. Pier Abetti, General Electric Co.

Protecting Devices Coordination for Distribution Systems, George W. Cooper, Line Materials Industries.

Utilization and House Heating

Heat Pumps in Modern Homes, Frank Fairfield, AIREFCO.

A New Approach to Atomic Power, Dr. Frederic de Hoffman, General Dynamics Corp.

Preparing to Serve the Load of the Future, C. W. Mills, Westinghouse Electric Corp.

Test Results of Electric School Heating, Wesley A. Dunn, Pacific Power & Light Co.

By working together on common problems

We Can Keep Abreast

Says Tom Ingledow, President, Northwest Electric Light & Power Assn.

T. Ingledow
B. C. Engineering Co.

THE Northwest Electric Light & Power Assn., I believe, is the only International electrical association on the continent. NELPA embraces the five Northwest states in the United States and the Provinces of Alberta and British Columbia in Canada. The opportunity afforded through the association for Canadians and Americans to become acquainted while working together on common problems is very important, because it forms the base of understanding and respect that is valuable when approaching problems such as are at hand on the development of the upper Columbia River for the generation of electric power and for other purposes. Whereas actual negotiations are carried on at the governmental level between the United States and Canada, our companies of NELPA are interested and need to keep abreast of developments and the reasons for such developments. The reasons are more acceptable if you are visiting them from a position of respect and understanding.

NELPA's officers and board of directors have this year stressed and promoted the theme *Think-Plan-Work Together*. As NELPA heads into its 51st year this concept is not a new one, but it serves to focus our attention on the fact that the more highly industrialized and specialized we become in this fast-moving world, the greater is the need for coordination between all facets of the industry. The past has been marked chiefly by a growing understanding of the social and economic responsibilities of business, but the rate of change of the past 50 years, fast as it has been, may appear to be slow in light of what is predicted for the next half century. In this atomic age, the rate of change makes it imperative that business think and plan far ahead in order to obtain the proper perspective to most effectively carry on present-day operations.

One of the methods we use to appraise our actions of today in relating them to the future is to bring segments of our industry together in conferences. These conferences provide a valuable forum for the sharing of knowledge, the results of which can be reflected in a delegate's company by increasing its revenue or, on the other hand, by pruning the cost of operation, which, in either case, allows a larger net profit at the year's end.

As president of NELPA this year, I am impressed at the amount of activity that takes place and the number of people volunteering to work on worth-while committees and activities. I would be remise if I didn't take this opportunity to express appreciation and gratitude to NELPA members, section and committee chairmen, the board of directors, and officers who have been functioning so effectively this year. Their hard work and willing cooperation is making this association year inspiring and productive.

In line with our theme of *Think-Plan-Work Together* the nonutility company members of NELPA have been asked to accept more association responsibility and it is a possibility that in the near future the nonutility company members will be eligible to hold elective office, including the presidency of NELPA. This is as it should be, for our trade allies feel a great responsibility to morally and actively support and promote the private electric utility companies, particularly when our industry is under attack by those who would like to see the utility companies taken over by various branches of government.

NELPA News, our association bulletin, has been inaugurated this year to help inform all association members on current industry problems as well as to provide statistical and survey information. Through *NELPA News* our various members are called together to discuss pressing problems relative to their field of operation. It provides an opportunity also to give credit to the individuals within the association and the industry who are contributing their time and effort to promote the electrical industry so that the public may be better served.

NELPA embraces all vital segments of the electrical industry, which provides us with the opportunity for industry-wide cooperation and a common approach in tackling our problems. We will be talking about many of these problems and offering some suggestions for their solution at our NELPA Annual Meeting, Sept. 28-30 at Vancouver, B. C. Inspiration will be provided by speakers from both sides of the border as we look at similar industry problems in our two countries. All our industry friends are welcome and invited to be with us.

Five of the men who will guide NELPA in the coming year: Al Krieg, executive manager; W. F. Fisher, California Oregon Power Co., E&O Section chairman; A. H. Skillin, Portland General Electric Co., chairman of the Purchasing Committee; Roland Blantz, PGE, Personnel and Safety chairman; D. J. McCaig, Montana Power Co., co-chairman of Personnel and Safety

President Leslie Hicks of Hawaiian Electric Co. presides at luncheon session. Walter J. Maytham, Westinghouse, general convention chairman, is second from right; C. W. Leihy, Electrical West program chairman, far right. At far left is Carl McCarthry, Pacific Gas and Electric Co., chairman of the stage manager's committee

PCEA Tackles Its Problems

LESLIE HICKS, president of Hawaiian Electric Co. and of PCEA, keynoted the convention theme in his opening remarks at the 42nd PCEA convention held in San Francisco May 20-22. Early in his administration the theme adopted for the current PCEA year was "Let's Tackle Our Problems—Now." As a first step toward the motivation of that theme representative leaders in each branch of the electrical industry were asked to outline their basic problems. Those outlined in the replies were serious ones and must all be solved.

In many instances, however, these problems were internal ones, within the branch of the industry in which the writer of the letter is engaged. They were not problems relating to the relationships between different branches of our industry or between our industry and its customers.

This seems most significant as it points to a tendency to become introspective, to look at our problems without seeing them in their true perspective as they relate to the whole industry or to its customers.

Another reflection of this same trend is the tendency to look to the government for solutions to so many of our problems.

Hicks said: "The spirit of 'rugged individualism' seems to have capitulated quite completely to the easier philosophy of 'Let's Pass a Law'; and it is in this philosophy that the roots of bureaucracy grow sturdy. Today our business enterprises are not directed so much by the judgment of management as by the edicts of bureaucrats.

"It is very doubtful that we shall ever return fully to the old way of life, in fact, as society becomes increasingly complex, it may require some of the checks and balances which were not necessary when life was more simple. It is indisputable, however, and a historical fact, that the pressure for greater and greater government control over business will never cease. The fight for freedom is an endless struggle." He called for the courage to regain the control of our own destinies and not look to a paternalistic government to decide our fates for us.

The advantage of teamwork is not a new concept in the electrical industry. It is the foundation upon which we have built our enviable record of growth and development during the past 40 years. Many will remember an organization that was created in 1917 and called, originally, the California Electrical Cooperative Campaign. (It later became the Pacific Coast Electrical Bureau which, still later, merged with the Pacific Coast Electrical Assn.) The objectives of that organization as conceived by our industry's leaders 41 years ago were:

"The object of this campaign is better electrical service to the public and, as a certain result of that service, more profit to individuals and companies in the electrical industry.

"It shall, therefore, be the advisory committee's object to cause the individuals affiliated with every branch of the electrical industry to have a better knowledge of their proper attitude toward companies and individuals in other branches of the industry."

The PCEA came into being in 1917, but at that time it was the trade association of the utility branch of the industry. Later it merged with the Pacific Coast Electrical Bureau as the all-industry organization that it is today.

The PCEA president said that his purpose in delving into history was to refresh memories, to re-awaken pride in what the industry has achieved in the past and to stimulate imaginations to a realization of the limitless opportunities that the future holds if we continue to work side by side as a united industry. He called on the industry to ignore any spirit of defeatism that may be seen in others and to rededicate ourselves to the positive thinking that was so characteristic of our predecessors.

More than 1280 were registered for PCEA's 42nd annual convention. At the business meeting Charles A. Wikle, Schulman Electric Co., Los Angeles, was elected president. Elected vice-presidents were: Reid Gardner, Southern Nevada Power Co., Las Vegas; Fred Oldendorf, California Electric Power Co., San Bernardino; Walter T. Lucking, Arizona Public Service Co., Phoenix; Ralph Johnson, Hawaiian Electric Co., Honolulu; C. W. Leihy, Electrical West, San Francisco.

In an effort to "tackle our problems now," the committee had brought together an informed group to speak on basic problems of the industry. That positive thinking underlay much of the three-day meeting is evident from the talks, excerpted in the following pages.

Three-Dimensional Conference

"You don't sink just half of a ship, just the officers' quarters or the crews'. If it sinks, the whole ship goes down as one piece. It is the same thing with the ship of state. If they start it sinking the whole thing will go down."

In just such simple analogies, brilliantly sprinkled with humor, dynamic Dr. Kenneth McFarland, educational consultant, General Motors Corp.—teacher, farmer, businessman and certainly eloquent speaker—sparked the convention off with the three-dimensional confidence he radiated. That never before were conferences so important because they teach leaders to fit them to go home and teach others. "A lot of people want to scrap our system and adopt the Russian," he said, then declared that the Russians are making a success of their educational system because they are running it under the extreme of free enterprise, with incentives, rewards, prizes and advancement. Here, however, the educators seem to be adopting extreme communism, seeking to level all students and discourage competition.

The Berlin situation, he declared, is proof that the free enterprise system is working so well that the Soviets are afraid of it. Berlin is the showcase of free enterprise, because in West Berlin the Germans and Russians can see the prosperity and fruits of enterprise in brilliant contrast to the mediocrity on their side of the Brandenberg Gate. The present crisis was not asked for by West Germany, or the free world. It comes from the losers in the competition who want to destroy it because they cannot meet it.

Dr. McFarland

King

America can stand with confidence against this threat, he said. But the people must be retaught in simple terms what free enterprise is. For the past 25 years it has not been working according to the rule book. Almost 60% of the population today never worked under the rules. They do not know that under these rules the customer makes the decisions, not labor or management. This must be understood and taught and confidence in the enterprise system rebuilt.

Teamwork Through Associations

The "Main Street" approach to the problems of the electric utility industry was recommended by Allen S. King, president of the Edison Electric Institute and president of Northern States Power Co., Minneapolis, at the closing luncheon of the convention.

Public power groups exerting "tremendous lobbying power" in Washington have carried their campaign against the free enterprise segment of the utility industry to a national scale. "The whole area of attack is kept vague and carefully avoids the corporate image that each of our companies has created in our own areas," said King.

"In these great national issues we must realize that there is no simple way of getting our story before the people. We cannot buy the job done, nor can we lean on any organization—national or regional. The job is ours to be done right down on Main Street," King added. "If each of our companies would realize that it alone can effectively reach the people in its territory, that such an approach is the only real way to reach all the people and would then lay plans to work with our friends and neighbors, the total result would create a tremendous impact upon national thinking."

King emphasized, however, that regional and national associations are essential to coordinate and stimulate efforts toward increasing public understanding of the problems of public utilities. He stressed the fact that not enough people are aware of the benefits of the American way of life. Our high standard of living, King pointed out, is a product of our free enterprise system. "Our workers are also our capitalists," he said, "and we should get over to people the large percentage of the fruits of our economic system that go to the worker."

Most of the problems facing the utility industry can be traced to "a gross misunderstanding of the facts of our economic system and particularly of the economics of our own electric utility business," King said. He outlined a two-point program for the industry. First, he said, should come education of employees and the public about the accomplishments and rewards of our economic system. Second, education of employees and public regarding the history of the electric utility business, stressing how it grew up as part of free enterprise and how it is now a regulated part of free enterprise.

Summarizing the present position of the free enterprise segment of the electric industry, King said: "At a time when the electric light and power industry has reached the point of greatest service to the public; when it has met every challenge of phenomenal increases in demands; when its financial position is extremely conservative and sound; when it is operating on a higher ethical plane than any other industry in the country; when the ownership of our corporations is widespread among millions of our people; and when there seems to be no real and basic reason for criticisin, we are facing our greatest attacks in the halls of Congress and the organized groups which have been set up to undermine us have made their greatest strides."

Incoming PCEA President Charles Wikle with Leslie Hicks, retiring president

Horton

Hamman

Barnett

Ives

Operation USA—

The business climate in which we work

Problems of Taxes and Inflation

"One of the most shocking statements that I hear—and this includes businessmen in our own industry—is that inflation is inevitable. I submit that inflation is man-made and as such it is not inevitable."

In these words J. K. Horton, new president of Southern California Edison Co., summed up his review of how constantly increasing taxes, paid almost only by privately financed utility companies, and inflation are making the power industry a sitting duck for socialist government ownership.

Two courses are open, he said, education and political activity. Both are directed to convincing citizens that their long-term interest must not be substituted for the immediate self-interest of a few.

"Today we have a political environment that encourages labor to seek wage increases in excess of productivity gains; a political environment that seems to reject thrift in favor of deficit spending; a political environment that sees nothing wrong or unfair with four out of five Americans paying 23¢ in taxes in every dollar of his electric bill, while the fifth fellow pays only 2½¢," Horton said.

The first step to correct such inequity, he said, was to make certain that employees and stockholders and public understand the true causes of inflation and its Siamese twin, taxes. Surveys of public opinion, he said, show that people are unaware of such tax discrimination in electric power but that when they are informed they favor fair treatment. He particularly stressed that the women of the industry, those employed in it and the wives of all employed in it, be told and enlisted to help.

"I am not talking partisan politics or preaching the support of one political party as against another," he said of political activity. "I am talking of the importance of the selection of people who think and act soundly. Party identification has lost much of its meaning. We have to change our political environment through our own people."

Some Problems of Western Growth

Water, air polution, auto traffic and urban sprawl were cited by Charles Hamman, Stanford Research Institute, as the major problems facing the West, some aspects of which could put a limit on the growth of the region. He then gave a quick analysis of each, the extent of its present seriousness, the steps possible to ameliorate it, and his own opinions as to the outlook for solution.

Of water, highly controversial in this arid area, solutions lay in solving transportation of water from regions of surplus to those of drought, and of developing more economical ways of conversion of salt or brackish waters. Of the latter some breakthrough can be expected before too long.

Air polution is not peculiar to Los Angeles alone, he said, and is an old problem about which much has been done and more is in prospect. He felt that technological means will be found to minimize this menace to Western growth.

One solution to auto traffic mentioned was that of making downtown areas off limits for cars. Those coming to the city would leave their cars outside the "roped off" circle and either walk or ride in to the center on mass vehicles or much smaller individual ones. Deliveries would be made at night.

Urban sprawl, he said required more study and a better understanding of the forces behind the apparent trends. He called for leadership from the industrial and business community in such research and for imaginative solutions instead of those based only on expediency. There is much at stake in property values, urban decay, etc., that requires the thinking of such leaders. Since the manifestations of all four problems are local the solutions must be local, even if they have to be coordinated at state and regional levels.

Washington and You

After reviewing the progress of the endless campaign to nationalize the electric power industry, a campaign of which the public seems to be either unaware or indifferent, Arthur Barnett, marketing director, National Association of Electric Companies, spoke of the handicaps under which the investor-owned power industry had to operate to counteract it. Even to inform the public of its side of the case was being denied it politically. Any politician activity at the Washington level was extremely restricted.

The extremely important thing that could be done, he told the group, was to win the friendship and support of their own customers and associates at home. These people do have an influence on the policy of the country because it is to them that the politicians must respond.

Financing the Next Decade's Growth

That Hawaii may contribute to the mainland more than it gets from the nation by teaching what it has so well learned in the integration of all races, colors and creeds was the opening tribute paid to the new state by Gerard Ives, vice-president, Morgan Guaranty Trust Co., New York.

While financially technical his analysis of the money needs to finance the fantastic growth expected by all for the West in the next 10 years was revealing and contained

several little-known aspects of the economy. Of the $960 billion of private investment that will be needed by the nation, the area served by PCEA utility members will need some 6½ billion, only 2½ billion of which can possibly be generated internally.

What proportion of such funds will come from what types of securities and what investors there may be—savings banks, insurance companies, pension funds and foundations, of individual investors—he analyzed each. Likewise he told who might be competing for such funds.

Of the individual investors, who must supply a quarter of the total, he simplified his analysis by asking what a person with $1,000 to invest (on which he has already paid Uncle Sam $500 in additional income tax) could do. His relative earnings if placed in a savings bank, government tax-free bonds and common stocks was discussed. The big question, "what is the future value of the dollar?" since the gold standard has been substituted by the "full employment act," he illustrated graphically by reference to the old Ford car prices and how the economy operated then to reduce cost and increase the value of the dollar.

Increased costs of bureaus and subsidy programs cause inflation which, if not checked, will lead to higher interest rates, concern over fixed income securities and inevitably toward higher rates for utilities.

"There must be more than growth in population and in technology to interest the investor. There must also be a good governmental atmosphere," he concluded.

"Let's Tackle Our Problems *Now*"

Basic Problem I

Education, Manpower and Training

Dr. Whaley

Dean

Is American Education Geared for the Future?

Endeavoring to answer the question "Is American Education Geared for the Future," Dr. Randall M. Whaley, executive director of the National Academy of Sciences, Washington, D. C., stated that American education is not even geared for the present. He pointed out that today's great concern over education shows that Americans are now recognizing that their responsibility for education is not a sometime thing. He indicated that the crisis in education is, in reality, a crisis in the community since schools only mirror the wants and desires of the community. Waving off the tremendous requirement for school plants as only requiring money, Dr. Whaley pointed to the more important problem of learning how to create intellectual resources. Intellectual resources contrary to physical resources can be created. The problem is learning how.

He stated that less than one tenth of one per cent of our expenditures for education are being directed toward research in how to do the educating job.

He pointed to some encouraging signs such as communication between industry and educational institutions as well as interchange of ideas between faculties at the high school and college level.

A most important problem, Dr. Whaley commented, is creating awareness of the increasing need for technical graduates. The requirement for technical employees is increasing at about three times the rate of our increasing population.

How To Grow Tomorrow's Executives

On the subject of "How to Grow Tomorrow's Executives," George M. Dean, northern California vice-president and general manager of the Pacific Telephone & Telegraph Co., said: "We aren't out for a uniform product, and 'organization man' with or without a gray flannel suit. Heaven help us if this is the result, because creeping mediocrity is probably a worse threat to business than creeping socialism.

"The days of the one-man corporation are over, probably forever. "Operations are too complex, too multifaceted for a one-man show. We simply must develop many more men with the spectrum of skills and abilities we term executive."

Dean outlined a six-point executive development program now being followed by the telephone company.

1. We start with good people.
2. We do everything we can to involve them deeply and personally in our development program.
3. We give them the information and experience they need to understand the company.
4. We continually evaluate them—looking for development needs.
5. We try to communicate to them the necessity to understand the larger framework of society.
6. We keep our program flexible—oriented to the individual, to his developmental needs and to the changing needs of our business.

Business needs men with many different combinations of strengths and abilities, Dean said.

"We only want to recognize, develop and utilize these combinations in the best, most efficient way.

"We cannot merely train in our own image—even if we wanted to—because we have every reason to believe business will continue to evolve."

Basic Problem II

Maintaining a Free Enterprise System

Dr. Stainbrook

Dr. Haire

Social Trends That Will Change the Future

Organizations do not exist to make people happy, as some human relations philosophy now in vogue would have it, said Dr. Edward J. Stainbrook, chairman, department of psychiatry, University of Southern Cali-

fornia. They exist to perform a function as efficiently and productively as possible. But an increased use of scientific study into human behavior is needed in order to counteract some of the social trends or influences today. Such social trends need to be understood for they are leading to apathy in citizenship, withdrawal from responsibility and lack of real interest in work. Discovery of counter trends can also come from such study, counter trends that can be stimulated to balance and redirect the energies of people toward meaningful activity.

Such could be distilled from the too fast and too technical talk by Dr. Stainbrook, a talk that probably was the most important one of the entire convention. If it failed to "communicate" to those who strove earnestly to follow it, that is a pity, because upon what it sought to say may depend the entire future of the industry, even of the nation and free enterprise.

What Dr. Stainbrook said in essence was that people can be "brainwashed" unknowingly by the influences of their surrounding society, the way they live, where they live, what their neighbors do and think. Suburban living brings more pleasures from family than from work and makes work accomplishment less meaningful. In large cities delinquency, suicide, divorce and other distress are highest in periods of heavy population change. People cannot quickly feel that they are of any importance or meaning to the community. Similarly in a company the first months of adjustment are toughest.

Instead of blaming employees for apathy or decreasing productivity management must seek to understand such social influences and counteract them with those producing a sense of worth-while participation in the work and the organization. On a larger scale the same holds for interest in the nation and the free enterprise ideal.

Motivation and Public Opinion

Dr. Mason Haire presented the group with a clear distinction of the actual truth and the psychological truth. The psychological truth being that which people believe and use as a basis for judgment. Thus, he indicated that the psychological truth, even though fallacious, is that which we must understand since it is this truth which prompts people to take social and political actions.

"In an economy that is built on consumer attitudes, it is important that we understand the anatomy of confidence if we are to maintain our free enterprise system."

Dr. Haire indicated that the Techniques of Motivation research can be applied to understanding the attitudes of people towards the utility industry. He pointed out the futility of straight forward factual attacks on public opinion. Once in possession of the corporate image it is possible to bring the psychological truth in harmony with facts. He indicated that conscious changes have been made in the banking industry that appear to be turning the banker from a psychological "bad guy" to psychological "good guy."

Basic Problem III

Maintaining and Improving Electrical Service

Bartlett

Christensen

Technological Progress and its Relationship to Future Earnings

Future profits of the American electric utility industry must be based upon a "solid foundation of technological achievement," C. H. Bartlett, vice-president of the Westinghouse Electric Corp., stated.

He commended the industry for its record "in reducing the price of its product against all the forces of inflation" during the past 30 years. At the same time he cited two goals for the industry.

"Our first objective for the future must be to continue to hold this line—but without sacrificing the earnings which are so necessary to finance the growth of the business," he said. "Our next objective must be to continue the expansion of the use of electric power and to achieve a better balance between winter and summer peaks.

"If we are to hold the line on electric power costs while increasing the use of power," he said, "we must work toward greater efficiencies of apparatus and operation, and better reliability of service."

Utilities have tripled their output per operator from 1,000 to 3,000 kw since 1930, and have decreased the fuel consumption from 1½ lb of coal per kwh to three-fourths of a pound today, Bartlett said.

Bartlett estimated that over-all, "technological advances in today's turbine-generators represent operating economies of some $750 million a year as compared to an equal capacity of 1938 vintage machines —this is nearly twice the average present annual investment in new turbine-generators."

Other savings, Bartlett said, will come from the "increased use of extra-high-voltage transmission lines." He pointed to the fact that a cost reduction of 40% is realized "for a given capacity in going from 220,000 to 345,000 v."

"There is much yet to be done," Bartlett commented. "The whole field of atomic power, the commercial development of thermoelectricity, automatic control of stations and load dispatching, system planning, are some of the many areas which offer great promise for the future but which will require substantial investment for research and development.

Are Our Purchasing Concepts Keeping Pace with Progress?

H. W. Christensen, director of purchases, Columbia-Geneva Steel Division, United States Steel Corp., discussed the question: "Are Our Purchasing Concepts Keeping Pace with Progress?"

He told the convention that many progressive companies are devoting a great deal of time and study to the problem of getting maximum value for their purchasing dollar. As a result, some of these companies have radically revised their concept of the purchasing function, what it should include, how it should be organized, what kind of people it requires and what its relationship should be to other departments.

Advanced management now recognizes that never more than now, and in the days to come, has the purchasing function been more important to the economic well-being of a company.

The whole trend of purchasing progress in recent years has been toward a more professional approach and toward professional standards of competence in handling an increasingly complex function. The purchasing executive today has scientific standards to guide his actions, challenge his efforts, support his decisions and prove his contribution to company cost reduction efforts and profitability.

He must be a specialist who not

only knows his job to the last detail but he must also be a man whose vision is wide enough to encompass the whole of his company's business and of the economic structure of which it is a part. He needs to see the whole picture and to function as part of that whole picture. In other words, he must be a "generalist" as well as a specialist. The purchasing executive in today's business world who cannot meet that fundamental requirement is sadly miscast in a management role.

It is hard to find a better opportunity for low-cost profit than that made possible by a systematic approach to value analysis of purchased materials. Because of this approach, advanced managements have radically revised their concept of the industrial purchasing function — now consider it a definite profit-making activity. Christensen described how a well-organized value analysis and standards program can make the purchasing dollar more effective, how the purchasing executive will be expected to use value analysis to make significant contributions to company policy and profits.

Basic Problem IV

Keeping Pace With the Future

Goss

Mitchell

Fresh Starting Points for Tomorrow's Selling

James H. Goss, vice-president and group executive, General Electric Co., stated that "residential load growth will outstrip both industrial and commercial growth during the next 20-year period, achieving a load growth 5.4 times greater than the growth achieved between 1938 and 1958." He pointed to the still lush lighting market and commented that the lighting load can be raised from today's average of 780 kwh per year to 2,500. He surveyed the increased potentials available from appliances and electric heating and cooling equipment and then pointed to the home of tomorrow as a possible turning point for tremendously increased power sales. "Just as inflation is bringing rapid electrification and automation to industry and commerce, so will rising costs displace the archaic methods of house construction. We stand at the threshold —a fresh starting point for tomorrow's selling."

In his picture presentation of the modular prefabbed home of tomorrow he commented that "it might require as much as $8,000 worth of electrical products and return $600 in annual revenue to the utility." He continued: "It is logical to suppose that when houses can be produced like appliances, substantial savings can be offered to the buyer. The fragmented house may prove to be our best weapon in obtaining a greater share of the consumer's dollar in competition with all other goods and service."

Fragmentation can add so much to convenience and livability, he said. Such houses can be expanded in size or contracted at will. "Used rooms for sale" may appear as frequently in the classified ad section of the newspaper as automobiles. Why shouldn't houses be merchandised like autos?

Getting Our Share of the Customers' Spending

Don G. Mitchell, president of General Telephone & Electronics Corp. and chairman of Sylvania Electric Products Inc., told the group a realistic projection of today's demands would increase the gross national product—the sum of the nation's goods and services—from the current rate of $465 billion to a rate of $600 billion in 1964 and a rate of $750 billion by 1970.

"In this entire picture, however, there is one big booby trap—inflation. You cannot create prosperity out of thin air and you cannot take more out of our economy than you put into it," Mitchell said.

"Some people are always tempted to try, and if they keep trying hard enough this country certainly will end up with a recession that will curl your hair."

The industrialist cautioned that "if labor takes all of the productivity increases in the form of wage increases, there will be nothing left to plow into the business. If industry simply passes along its increased cost by raising prices, inflation will go up still higher. If government keeps on financing deficits, there won't be anything left for anybody."

In the field of technology, the great expansion of research and development, for which about $10 billion were spent last year, is expected to climb to more than $20 billion in the 1960s, Mitchell declared.

Arnett
PGE

Montana Power
Hofacker

Purchasing Panel

HIGHLIGHT of NELPA's Purchasing and Stores meeting was a panel discussion presided over by Roger Hofacker of the Montana Power Co. Manufacturing and distributing elements of the electrical industry were represented by E. A. Casey of Anaconda Wire & Cable Co. and A. W. Wiegenstein of the Westinghouse Electric Supply Co. In discussing the subject "Does the Buyer Get What He Pays For?" or "Can Quality be Measured by Price?" these gentlemen described pricing procedures and the philosophies employed by manufacturers in attaining company goals. While modern costing methods enable companies to place a price figure on each item of equipment, competition, the per cent return on the investment in production facilities, the rate of company growth and the continuity of investment return all affect the ultimate quotation. Furthermore, price considerations are also affected by time, place and quality. It was also pointed out that quality was inherent to the products of most reliable manufacturers.

Representing the utilities, W. C. Allen, purchasing agent of Utah Power & Light Co., and Howard Arnett, vice-president of the Portland General Electric Co., described the buyers' viewpoints. In this discussion the importance of "value analysis" was emphasized as well as other factors such as maintaining representative sources for material and the ability to render both delivery and engineering services.

A question-and-answer period followed the brief discussions by the panel members. This brought out several aspects of the sales and selling operation. Particularly stressed were the relationships between the purchasing department and engineering department in so far as the final decision on orders is concerned. Also discussed was the allocation of business between full-line manufacturers and the values that should be placed on research contributions—both with inconclusive results.

NELPA Business Development Section

Gets Set to Build New Load

Chairman Frank Reis, PP&L, center, talks with R. S. Quig, Ebasco Services, left, and W. J. Ridout Jr., Electricity on the Farm Magazine, speakers at the opening session

AWARENESS of the salesman's importance in the industry's critical years ahead was evidenced throughout the 34th annual conference of the Business Development Section, Northwest Electric Light & Power Assn., in Portland's Multnomah Hotel, May 18-19. Meeting jointly with the rate research and public relations and advertising committees, the group put into action this year's theme, *Think—Plan—Work Together*, to devise ways to help the industry and its customers through better electric living.

Compression of the deliberations into two days, instead of the usual two and one-half or three, was an experiment to gage the effect on attendance of the shorter meeting time. Although many regretted the shortened meeting with friends and associates in other companies, nothing but commendation was heard for the program arranged by Section Chairman Frank Reis, Pacific Power & Light Co., and the guidance committee.

General Sessions

Welcoming the group to Portland, Mayor Terry D. Schrunk proved himself an able salesman as he told of the city's industrial growth and prophesied that today's power load is only a small part of the demand to come in Oregon's second 100 years.

Load building is a strong bulwark in preserving private operation, Frank M. Warren Jr., president of the host company, Portland General Electric, said in his opening address. Also a vice-president of NELPA, Warren wore two hats, substituting for the association president, T. Ingledow, B. C. Engineering Co., Vancouver, who was called to London just before the conference convened. (See talk p. 75)

High usages mean minimum costs, he pointed out, and a satisfied public, using our product, is not going to be interested in public ownership. If we have markets, he continued, it will be no problem to get the money for plant expansion, since a growing company can attract capital on favorable terms.

Also looking to new plant requirements of the next 20 years, Robert S. Quig, rate department manager, Ebasco Services Inc., New York, declared that tomorrow's revenue will be dependent upon decisions made today as to investment utilization and pricing policy.

More meaningful data are needed to aid management in policy-making decisions, he told the group, and the most useful tool in this process is a well-organized and well-directed program of load research. This should not merely record where we have been, he emphasized, but should analyze present trends as an aid to forecasting future loads, serving as a guide to improved operating and administrative practices.

Dynamic growth in air cooling loads and the tremendous potential of electric space heating, both with high seasonal demands, have brought management to the realization that, in view of the large capital expenditures involved, there must be more planning on handling loads, Quig stated.

Pointing to past reluctance to undertake full-scale load studies because of the time and labor required to produce useful results, Quig said that new electronic equipment, designed especially for survey purposes, is making the data available within a reasonable time after tests are completed. He added that perhaps the greatest single advantage of the new load measuring devices is the fact that they are adaptable, both from a time and cost standpoint, to the measurement and study of individual loads, making it possible to use the technique of random sampling in selecting customers for tests.

Calling for a reappraisal of utility sales efforts, Quig pointed out that, when inflation is taken into account, the figures show that the industry is spending considerably less for sales promotion today, when plant investment and competitive forces are at highest levels, than it did in 1948.

The fallacy of defending America in terms of material things was pointed up by Dr. Otto M. Brees, National Association of Manufacturers, Palo Alto, Calif., in a luncheon talk that brought tears to many eyes and earned heartfelt applause. America is a heritage of opportunity and ideas, he said. We have an aristocracy based on ability and, if we penalize it out of existence by removing personal reward, we will have sold ourselves down the river, he believes. Nobody can make us free from want and keep us so except ourselves, he said, and the welfare state is the farewell state. For his son he wants the chance to fail and the chance to succeed. Failures, he said, but contribute to success if one knows how to use them.

"Don't gamble with the eyes of other people," urged George J. Taylor, president of IES and vice-president of Day-Brite Lighting Inc., New York, in a talk on the new

Anne Ogden, PG&E, confers the Mystic Order of the Rose on Dr. Orlo M. Brees, National Association of Manufacturers, luncheon speaker; Reg Plymire, Puget Power, looks on

General session speakers: above, George Lippincott Sr., Nic-L-Silver Battery Co.; H. H. Watson, General Electric Co.; below, George J. Taylor, Day-Brite Lighting, IES president; Robert Hastings, Pacific Telephone and Telegraph Co.

IES lighting levels recommended in the Blackwell report.

Pointing to resulting load increases, he said that everybody would benefit from the higher levels but that men and women in industry and children would gain the greatest advantage.

"We are not upping foot-candles," Taylor said, "we are providing the light required for our way of life today." Research has proved that these levels are necessary, he said.

"Let's work this thing out together and not apart," he urged. "Lighting up America for peace, safety and well being is your challenge," he concluded, "I hope you will accept it."

With marketing representing 59% of the sales price of manufactured items today, direct selling is not doing its part in cutting business operating expense, R. J. Hastings, sales supervisor, Pacific Telephone & Telegraph Co., Los Angeles, charged.

Without realizing it, some concerns are paying as high as 20% to sell the lower third of their business, the small-profit accounts, he pointed out. Since this lower third cannot be ignored, he recommends selling it by telephone to get the greatest possible return at the lowest sales cost. Most salesmen, he said, spend less than 30% of their time in actual selling with customers able to buy. The average good salesman can make five to ten sales calls a day in the field but he can make 10 an hour by telephone. One hour a day on the phone would be well spent, Hastings believes.

Techniques are different, he said, but the average salesman can be successful if he realizes that he is working in a different sales environment and compensates for it.

Although electrical safety codes are necessary and effective, the upgraded requirements of the NEC and the considerably increased specifications of FHA still do not provide the wiring content necessary for today's electric living, it was pointed out by H. H. Watson, commercial engineer, Construction Ma-

Early in the conference, delegates learned to depend on the men in the red coats—the efficient arrangements committee. Here are three of them, caught in what was probably their only still moment in two days of attending to the many details that make up a smooth-running session. They are from left: General Chairman Leo Chaffin; Merrill Bickford, housing and registration chairman; Nick Mason, assistant general chairman. All three are from Portland General Electric, the host company

At the Electric Home Bureau meeting: Marguerite Fenner, Pacific Gas and Electric Co.; Vice-Chairman Clarence Kommers, Montana Power; Grace Schoeni, Portland General Electric

At the Commercial and Industrial session: Jack Cottingham, PGE (behind centennial mustache); Chairman W. R. Reed, Idaho Power Co.; Roland Pillat, Typhoon Heat Pump Co.

terials Department, General Electric Co., Bridgeport, Conn.

Service entrance requirements are in good order, he said, because the size of entrance required for minimum safety is adequate for most residential loads. It is provision for lighting and circuits and outlets for appliances and equipment that is still lacking.

Following action making the former Residential Wiring Handbook the American Standard Requirements for Residential Wiring (ASA C91.1-1958), the industry has an American Standard for residential wiring with carefully worked out provisions for the wiring content needed in today's residential construction, he said. Since utilities, contractors and manufacturers worked together to bring it into being, he believes it will become the wiring manual for this explosively expanding industry and recommends its use as an answer to the problem of what to do about minimum codes.

Discussing the NE code revision to be presented to the June 2 meeting of the NFPA, Watson reminded that the revised basis for calculating service entrance ratings for residences was recommended by the NELPA Business Development Section two years ago. The 1959 code will include an optional calculation in many respects the equivalent of the recommended method worked out by H. Jack Reeves for Washington Water Power Co., he said. Details of the new optional calculation showing added capacity provided for heating loads were shown in slides.

Speakers and chairmen for the joint section meeting: Harold Anderson, WWP, Public Relations and Advertising chairman; D. J. McGonigle, Montana Power; Frank Falge, Live Better Electrically; Bill Tate, PGE, Electric Home Bureau chairman

One of the attractions of the conference for both delegates and the general public was a small, smartly designed automobile displayed in the hotel lobby and taken out the second day for a televised run. This was the prototype of Nic-L-Silver Battery Co.'s electric car, brought from Santa Ana, Calif., through the cooperation of Washington Water Power Co., which is showing it in Spokane.

Final speaker at the general session Tuesday afternoon was George Lippincott Sr., president of Nic-L-Silver Battery Co., whose factual yet humorous presentation held the interest of his audience despite the hour.

He foresees a major industry in the Northwest for the electric car market that is here now and to come. At present, he said, the company is making the cars only in its Santa Ana plant to avoid errors and to determine cost of production. However, the very simplicity and nature of the vehicle makes it possible to manufacture and assemble them in any area that has potential customers. The freight saving, he explained, would mean pricing in the more competitive field with many imported cars.

Molding of the fiber glass bodies can be contracted to companies making boats, thus furnishing year-round instead of seasonal employment, he said. Batteries are made from lead and silver, mined in the Northwest and it is planned to make frames of aluminum, also available in the area.

Reporting that a kit now being developed will permit many people to convert present cars or trucks to electric operation, he suggested installation of coin operated charging outlets in parking lots and supermarkets.

Parallel Sessions

Parallel sessions on Monday afternoon and Tuesday morning were devoted to special interests and, as usual, these section programs provided some of the real meat of the conference. Chairmen setting them up were: Commercial and Industrial, W. R. Reed, Idaho Power Co.; Electric Home, W. L. Tait, Portland

New officers and chairmen: Al Krieg, executive manager; Darcie White, vice-chairman; R. F. Plymire, chairman; W. A. Lowe, Commercial-Industrial Bureau Chairman; Clarence Kommers, Electric Home Bureau Chairman

General Electric Co.; Advertising and Public Relations, R. Harold Anderson, Washington Water Power Co.; Rate Research, Leo Aaltonen, Puget Sound Power & Light Co.

Commercial and Industrial

Lighting started off this session, with Jack Cottingham, PGE, showing his company's model rooms to prove that good seeing is good business. With average annual cost of operating an office running to an estimated $30 per square foot, annual cost of a typical inadequate office lighting system runs about 25¢ per square foot, he said. By installing proper planned lighting, annual office operating expense is increased by less than 3% based on a five-year amortization, he pointed out. For this small increase in cost employee efficiencies can be stepped up anywhere from 5 to 10%, a recent study shows.

Stating that his audience was sitting in what amounted to a box full of dirty air and in the course of his talk, each person in the room would breathe about 10 cubic feet of it, G. D. Carr, Westinghouse Electric Corp., Seattle, went on to discuss the remedy—electrostatic air cleaning. First cost of this efficient air cleaner is higher than other methods, he said, but operating costs are among the lowest. Over the years a user will find that it costs but a little more to own and use a 90% efficient electronic cleaner than a 10% efficient mechanical filter, he stated.

To combat sharply increased sales efforts by competitors, those in the commercial cooking field need to build more load among smaller customers. That was the contention of George Klopp, Hotpoint commercial district manager, in his talk on "What's New in Commercial Electric Cooking." These smaller establishments often need only 12 to 24 kw of new cooking power to double their production efficiency and improve their net profit, he said.

There is a wealth of untapped load potential from as many as 80% of your food service operators, Klopp told the group. He believes that the industry has spent a disproportionate amount of selling effort on the remaining 20%, the big operators, in its desire to secure the all-electric job. More total connected cooking load would result from re-emphasized effort on smaller accounts, he thinks.

How little heaters make big loads was told by R. M. Hermann, Montgomery Bros., Portland, who pointed out that one 500-w strip heater used day in and day out on some insignificant industrial application can consume more energy in a year than a domestic electric range. A number of application ideas were presented.

Electric Home

A coordinated promotional calendar for the Northwest was presented by W. L. Tait at a joint meeting of the Electric Home Bureau and the Advertising and Public Relations Committee. Prepared by a task force assigned to the job this year, the calendar will be sent to sales executives of member companies for their approval or suggestions. July 25 is the deadline, Tait said.

Montana's successful Electro-Day promotion was described by D. J. McGonigle, Montana Power Co. Aimed at improving the industry's position on the competitive totem pole, Electro-Day is concentrating on the local level, where sales are made. Under the program the entire industry markets together one day a month, with advertisements in eight morning and evening newspapers. Grand total for 13 Electro-Days: 2,862 ads and 107,625 column inches, the equivalent of 637 full pages.

Reporting on the Live Better Electrically program, Frank Falge, General Electric Co., said that, with a national objective of 120,000 Medallion Homes, Western utilities plan to install 22,677 Bronze and 3,876 Gold Medallions during 1959. These homes will create a $372 million market for manufacturers, distributors, dealers and electrical contractors, and will bring a new residential load of 1.5 billion kwh, he said.

A manual for Medallion Home modernization is now ready, he reported. The utility uses the same Medallion and the same requirements for appliances, lighting and wiring.

The entire conference joined the group for the premier showing by Harold Anderson of Washington Water Power Co.'s motion picture, *The Dam Story*. A frank presentation, this film pulls no punches in

Jeane Faulkner of NELPA tries out the electric car in a moment of relaxation from her duties at the registration desk

dealing with the private vs public power controversy.

Details of Portland General Electric's home lighting workshops for contractors were presented by Grace Schoeni of that company at the Tuesday morning session.

Convinced that the electrical contractor was the key man in improving lighting standards for its Medallion Home program, the company decided to give him a selling tool, a Medallion Home Lighting Manual, to explain its use in a series of workshops, and to offer an incentive for cooperation.

The workshops are usually held in the local PGE office from 5:15 to 6:45 p.m., with dinner following. Attendance is limited to six contractors per session. After a contractor has attended one workshop and wired one Medallion Home, his name is dropped into a barrel, from which will be drawn winners of Hawaiian trips.

Practical facts to be faced in load-building efforts were pointed out by Marguerite Fenner, Pacific Gas and Electric Co., San Francisco, in her talk, "Utilizing the Mass Approach to Sales."

While our market is the best in the world, changes have taken place calling for a new look and some adjustment in developing it, she said. Not the least of these changes are economic and less expensive and/or more effective methods of building business may be required, she pointed out.

A five-year survey recently completed by the company's advertising agency shows that a large share of appliance sales are to people who at first appear to be unlikely customers—a potential for aggressive salesmanship, mass promotion and demonstration.

Since, in her opinion, nothing equals demonstration as a means of selling women household appliances, Mrs. Fenner suggests making more opportunities for home economists to demonstrate to sell. The best place for this, she believes, is in the dealer's store.

Greater emphasis should be put on increasing the use of existing appliances and this also can be accomplished through a mass approach, she said. One method used by PG and E is a program of 12 slide-lectures for organized women's groups, covering lighting, portable appliances, ranges, freezers, entertaining. Mobility, ease of set up, a ready-made audience without promotion, low cost and elimination of time-consuming planning, marketing, food preparation and clean up are advantages of this type of program.

Rate Research

Consensus of the Rate Research Committee was that electric space heating in schools is a desirable new application because of its load characteristics and because water heating loads normally follow. No new rate features have been developed in the residential space heating field.

Committee members felt that rate provisions alone are not sufficient to combat gas competition successfully. Rate provisions to encourage electric water heating, they believe to be practically essential as far as customers are concerned but of no interest to speculative builders. Sales people meeting with the rate group agreed.

Discussions on seasonal loads for load factor improvement pointed up the basic theory that the ultimate goal in selective load building is achieved when seasonal load requirements can be met with available seasonal resources. Generally seasonal loads considered useful in matching requirements to resources in the Northwest are irrigation and/or drainage pumping; air conditioning and heating of swimming pools.

Special rate problems pertaining to underground service to shopping centers and to street lighting were considered.

It was felt by the committee generally that it could be more useful to member utilities in joint studies if it met more frequently.

New Officers

R. F. Plymire, Puget Sound Power & Light Co., will be next year's section chairman; Darcie White, Utah Power & Light Co., will be vice-chairman. Heading the bureaus and committees will be: Commercial and Industrial Bureau, W. A. Lowe, B.C. Electric Co., chairman, A. B. Couch, Puget Sound Power & Light Co., vice-chairman; Electric Home Bureau, Clarence Kommers, Montana Power Co., chairman, R. J. O'Connor, Idaho Power Co., vice-chairman.

Will Bowman, Utah Power & Light Co., will chairman the Public Relations and Advertising Committee and Bjorn Gadeholt, Pacific Power & Light Co., the Rate Research Committee.

The 1960 conference will be held at Yakima, Wash., with Pacific Power & Light Co. as host. In 1961 NELPA's new member, Calgary Power Co., will be host at Banff Springs Hotel.

In its Information Committee meeting

RMEL Stresses Communications

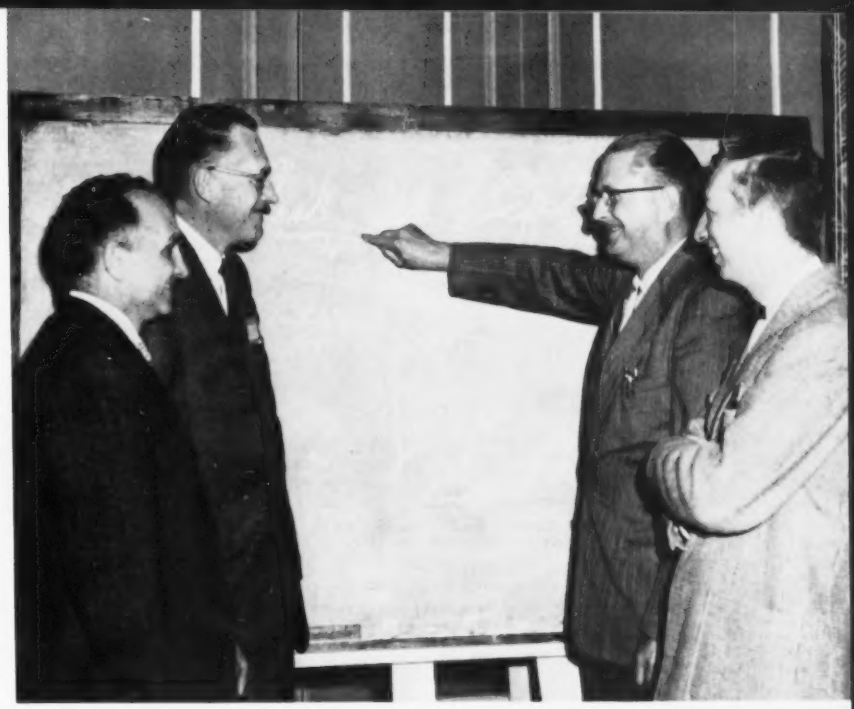
UNDER the chairmanship of L. H. Albee, General Electric Company, Denver, RMEL's Information Committee stressed the importance of communications both with employees and with the public. Art Bazata, a public relations counsellor of Denver, led off by stressing the difference between publicity and public relations. The latter is a corporate way of life that makes people like or dislike to do business with a particular organization. A favorable attitude develops from sound operating policies, good employee training and, in the case of public utility organization, a recognition that monopoly emphasizes the importance of courteous, interested dealing with the people.

In a panel discussion of news media representatives, it was pointed out that good contacts with local newspaper personnel and radio stations will improve the ability to disseminate news about company activities. Particularly important, in so far as the press and radio are concerned, is the availability of contacts within the company where they can get information in times of power outages or other local disasters.

John Kerr of the Public Service Co. of Colorado and Richard W. Wright of the Mountain States Employer's Council emphasized the need for better communication with employees, both from the standpoint of morale and public relations. Wright told the meeting bluntly that there is no easy way to tell the company story to employees, although advertisements, speeches and canned literature are of some help. Management must communicate satisfactorily with owners, customers, employees, suppliers and the government. Ways of doing this effectively, he suggested, are to reduce the message to be gotten across to understandable terms for the group of people for whom it is intended.

"Be specific by taking one or two subjects at a time for discussion; be factual and avoid the "scare" approach."

Human Relations Take Spotlight



Professor Max C. Carruth; Roy H. Elfstrom; Professor Elmer R. Smith; Dr. Oakley J. Gordon were on the safety panel at NELPA's Salt Lake City meeting

INDUSTRIAL and human relations tooks the spotlight in deliberations of the Safety Section meeting of NELPA. A feature of the discussions was a panel round table on the "Human Relations Approach to Safety" presided over by three professors from the University of Utah. Paramount in this discussion was the conclusion that there is a "permissive" area in enforcing safety regulations which is controlled largely by both the attitude of the supervisor and the employee. The importance of group participation in setting up safety procedures was emphasized as a means of obtaining better discipline over infractions. Also important is the method of communications employed to emphasize safety. For example, the type and location of signs, the handling of group conferences and the methods of enforcing safety discipline play a large role in how well the safety message "gets through" to the workers.

The effectiveness of NELPA companies' safety program was indicated by a consistent drop during the past 10 years which brought the severity level to the lowest point in 1958, down 60% from the previous year. The frequency rate also was down 7.7%.

Roy Elfstrom of the B.C. Electric Co. was chairman of this year's Safety Section activities.

Morley Fox, B.C. Electric, was Personnel Section chairman.

Bob Mason from Idaho Power had already prepared and distributed his talk on Comprehensive Medical Plans which left ample time for discussion. Idaho Power has succeeded in instituting a deductible medical program—which should be a long-term objective for any company. The discussion brought out details of procedure and the plan itself.

Professor Gray of Cal Tech, in his talk on industrial relations at that institution, described the summer classes, the winter program of enrolling the engineers in human relations courses. Included in the program are the liaison with the community, the consulting work done for the aircraft industries, department stores, public utilities, and others in the southern California area.

Peter Piper of Washington Power Co. reported on the wage settlement pattern throughout the Northwest. The standard lineman's rate is becoming $3.23, plus anything up to $1 per hour in fringes, depending on the company. Full details of the value of the fringes are included in the fringe benefit survey conducted by NELPA.

"Are We Making Sissies Out of Our Workmen?" This was a very straightforward address by D. Shevalier, division manager in Helena for the Montana Power Company. He recounted changes in attitude towards workmen from the days of 10 years ago, and he left no doubt as to how we were now treating our workmen. He was able to make specific references because of his detailed knowledge of union agreements.

Waldemar Seton, vice-president of Portland General Electric Co., gave the group a top management approach to the personnel function. He went through the operations of the industrial relations division of his company and gave his objective thinking on how they paid their way, whether tangibly or intangibly.

Don McCaig of Montana Power discussed "Coordination of Personnel Department Activities," which had to do with the benefits of creating a personnel department (rather than letting personnel policies grow independently in each operating group from nothing). The area of decentralization, once a central staff department had paved the way, was not discussed at this meeting.

R. R. Blantz of Portland General Electric was elected as chairman, Don McCraig of Montana Power as vice-chairman of the section for the ensuing year.

The Program

Are We Making Sissies Out of Our Workmen, Dix Shevalier, Montana Power Co.

Coordination of Personnel Department Activities, D. J. McCaig, Montana Power Co.

Grounding Practices with Specific References to Supervisory Control, F. D. Norbert Utah Power & Light Co.

The Industrial Relations Program at California Institute of Technology, Prof. R. D. Gray, California Institute of Technology.

Management Looks at Personnel — Is It Paying Its Way, Waldemar Seton, Portland General Electric Co.

Overhead Costs on Employing and Retaining Staff, C. H. Campbell, Pacific Power & Light Co.

Personnel Problems Associated With Absorption of Gas Properties, F. W. Campbell, Washington Water Power Co.

Review of Fatal Accidents, R. R. Blantz, Portland General Electric Co.

Survey of Personal Equipment Supplied by Companies, E. P. Kelly, Puget Sound Power & Light Co.

Blackfoot, Idaho—Mark Lundy, Fred Vogt, chairman, Hy Hanson, Mayor Jeppesen, W. L. Gaffney, NW secretary, Frank Stetka, NFPA

Inspectors of Nevada, Utah, Idaho, Learn of New Code

Karl Geiges, UL, and Howard Lindsey, Nev.

Bill Gaffney, James Paxton, NW Section

Norman Hall, Utah Chapter chairman

WELL coordinated this year were the traditional annual meetings of the Nevada, Utah and Idaho Chapters of International Association of Electrical Inspectors, held respectively at Winnemucca, April 18, Salt Lake City, April 20, and Blackfoot, April 22. This made possible an excellent report on changes in the forthcoming 1959 edition of the National Electrical Code by Frank Stetka, field engineer, National Fire Protection Assn., Chicago (see p 90), at each. Section officers and speakers were also enabled to address two or all three groups. Attendance was correspondingly large and interested.

Besides Stetka, Karl Geiges, vice-president, Underwriters' Laboratories Inc., Santa Clara, spoke to the Nevada Chapter on conductors and conductor insulation and the Utah Chapter on panelboards and service equipment. Lester Johnson, General Electric Co., Salt Lake City, appeared on all three, as code discussion moderator and in Idaho to talk on installation of heating cable.

In his youth Leon Guibara, Kaiser Aluminum & Chemical Co., Oakland, tells of fighting a bull in Mexico but this ebullient toreador braved the copper country by talking upon and demonstrating aluminum wires, cables and conduit to gain the favor of inspectors who may have to pass upon its use. He did so at all three meetings, doubling in the evenings to entertain.

Section officers who attended included both presidents and secretaries. Chester Hefner, San Mateo, Southwestern Section president, told the Nevada group the plans for the Section annual meeting at Santa Rosa, Aug. 31-Sept. 3, where the code workshop plan will be continued because of its effectiveness in

Chet Hefner, SW president, Hal Morr, IAEI past president, Frank Stetka, E. C. Braswell

Utah new officers A. H. Bywater, William Whetton, J. A. Clinger

Nevada's Lynn Steiner, Ralph Bisset, chairman, John Smales

member participation in the more intimate discussion sessions. He also urged the reporting of fires and accidents, participation in code panels and increasing the membership of active inspectors.

Lou La Fehr, Southwestern Section secretary, gave the Nevada chapter the IAEI organization news (as Stetka reported on national news on behalf of Everett Cogan, unable to be present). La Fehr announced that the New Mexico Chapter was now a member of the section. Also that the 1960 section annual meeting will be held in Reno in September.

James Paxton, Spokane, president of the Northwestern Section, spoke briefly at the Utah meeting, inviting all to attend the annual meeting in Seattle, Aug. 24-26, at Seattle Hotel. W. L. Gaffney, Tacoma, section secretary-treasurer, told both Utah and Idaho Chapters of bylaw changes to be voted upon at the annual meeting. He also participated in the code panel discussions. Because of his long association with both the code and association his views are valued.

Hal S. Morr, past president both of the IAEI and Northwestern Section, who shepherded during his administration the reorganization of the headquarters office, gave a report at both Utah and Nevada meetings of the most recent developments in the Chicago office. He explained that finances restricted the travel of Secretary Cogan to section meetings only. Speaking of a move to obtain professional status for electrical inspectors he said, "You cannot become a professional just because you say you are. You can only acquire that status by acquiring the knowledge that brings you recognition as a professional." He commended the Southwestern Section for the work being done by its educational committee, headed by Prof. I. J. Sandorf of the University of Nevada, who had reported at the Nevada meeting.

Sandorf said that a teaching manual was in preparation for use by chapters at the local level either with or without the assistance of local school adult education facilities, or even as the basis for a correspondence course. It would cover, for the novice or inspector expected to cover electrical as well as other building work, some basic electricity and code. Then the operation of an inspection department would be covered, and finally the relations of an inspector with his city officials, contractors and public.

H. G. Ufer, Rome Cable Co., who aided in the program for the Nevada Chapter, one of his "babies," for he had helped organize it when secretary of the Southwestern Section, spoke on membership at both Nevada and Utah meetings. At the latter, having some financial difficulties, he particularly urged seeking more Type F city and county memberships.

Officers elected for the Nevada Chapter were: Ralph Bisset, new Reno inspector, as chairman to succeed E. C. Braswell, California Pacific Utilities, Winnemucca, who presided over the meeting; Lynn Steiner, Ely, vice-chairman; John Smales, Elko, secretary-treasurer; and on the executive committee, E. P. Gibson, Las Vegas, R. L. Osborne Jr., E. C. Braswell, J. Howard Lindsey, M. L. Lundberg, John Kitchen and Norman Revaleati.

For the Utah Chapter, to succeed Norman Hall, Salt Lake City, who presided, as chairman, William Whetton, Ogden city inspector; Lloyd Grames, Board of Fire Underwriters of the Pacific, first vice-chairman; J. A. Clinger, Orem inspector, second vice-chairman; and A. H. Bywater, Utah Fire Rating Bureau, secretary-treasurer.

In Idaho chapter, L. G. Nelson of Buhl succeeded Fred Vogt of Blackfoot (both state electrical inspectors) as chairman. A. M. Kopeland of Lewistown was named first vice-chairman; A. L. Callow, St. Anthony, second vice-chairman; Gaylor Dennison, Boise, secretary-treasurer; and on the executive committee, Fred Vogt, Delbert Squires and R. C. Young.

Prof. I. N. Sandorf, U. of Nevada, told of Southwest Section education program

There'll be these changes in the 1959 NE Code

IMPORTANT changes that may be found in the forthcoming 1959 edition of the National Electric Code were summarized to the Nevada, Utah and Idaho Chapters of International Association of Electrical Inspectors by Frank Stetka, field engineer, National Fire Protection Assn., and Correlating Committee secretary somewhat as follows:

New Numbering System – While in general the article number remains the same, the paragraphs or sections are now given a sub-number following a hyphen. For example, former Section 2101 now becomes 210-1. (In the Advanced Reports of the proposed 1959 Code, NFPA includes a cross-index showing paragraph by paragraph where the comparable new paragraph is to be found under its new number. In bold type are shown those that have had an alteration of intent made in the new code.)

Chapter 9 of construction specifications and tables has been eliminated but its contents have been inserted in with those parts of the code to which each table applied. Thus 9310l on conductors, with its table, becomes 310-2-**Application and Construction.** But the new table also tells the temperature limitations of each type of wire and to what use it may be applied. Similarly Table 1 in Chapter 10 of the old code becomes Table 310-12 in the article on conductors.

Demand Calculations in Article 220 show many changes as well as an alternate method of calculation for residential load. Office building wattage per square foot minimum has been raised from 3 to 5. Two 20-amp receptacle circuits will be required in dwelling occupancies for the small appliance load. Although fixed electrical space heating requires 100% demand, an exception is permitted where the inspector finds that duty-cycle or intermittent operation will not permit all units to be on at one time. Likewise where noncoincident load, such as winter space heating and summer air cooling, are on the same feeder the smaller of the two may be omitted from the total because it is unlikely that both will be operated at the same time. A demand factor on clothes dryers also is permitted after the fourth unit. Demands for wall-mounted ovens and counter-mounted cooking tops are in a table with ranges.

The optional calculation for one-family residences uses 100% of the air conditioning, central electrical space heating, less than four separately controlled space heaters and first 10 kw of all other load (including range, appliances and lighting) and permits a 40% demand for all remaining load. Four examples of the calculation under both methods are given at the end of Chapter 10. A 1,500-sq-ft house instead of 2,500 is used as being more typical. Significantly air conditioners, whether of window or fixed type, are treated as low-power-factor motor loads, as indeed they are and are listed as fixed appliances.

Noninterchangeability of circuit breakers, long asked for by inspectors, is to be required on lighting and appliance branch circuits in residential and other occupancies except where the conditions of maintenance and supervision assure that the proper ratings will be continued. This applies to breakers of 0-250 v, a-c and not more than 100 amp. Ratings are to be 0-20, 21-50, and 51-100 amp. The breakers and their mounting and busing shall be so arranged that **it will be difficult** to replace any with one of a higher rating.

Type S fuses, long held back by a fine-print note, will become mandatory January 1961.

A new Table 1, in Chapter 10, combines both the old Tables 4 and 9 and permits many more than the previous limit of nine conductors in a conduit. As many as 208 No. 12 can be run (as might be needed for control circuits) but it will require a 5-in. conduit. And, by a new footnote 8, to Tables 310-12 to 15, very important to the use of the table, ampere loading of the conductors must be derated after three conductors per conduit.

Among other changes are: Fixture wire is not to be used for circuit wiring between or in end-to-end mounted fixtures. There is no more reference to **"weatherproof" wire. A 30-amp circuit** can only take a 30-amp receptacle, not one of 20 or 15. **Taps for separate range tops** and ovens may only be 18 in., and the plug may not be considered a disconnecting means. Such devices are considered to be fixed appliances. The tap length is considered long enough for servicing. The type of wire used is to be determined by the temperatures in the space in which the circuit is run. Only **grounding-type receptacles** are to be used where plumbing is near, or outdoors or near ground. **Range tops and ovens** may be grounded to the neutral as are ranges.

Mounting of fluorescent fixtures against combustible low-density cellulose fiberboard, while not changed as to spacing requirements, now has defined in a footnote to 410-74 what such board is. If it has a density of 20 lb per sq ft or less, it is considered combustible. If over 20 lb, it is considered safe. This eliminates controversy and permits mounting on wood, plywood or hardboards.

Many other changes are minor or editorial, such as that the old 150% rule on motor control rating is out because the new wire tables take care of the situation.

IES President George Taylor got into the "Rush to the Rockies" spirit with beard

IES Intermountain Conference

told how

Light Rushed to Rockies

Usually three regional conferences of the Illuminating Engineering Society are held at this time of year, in a series so that officers and national authorities may tour from one to the next. This time there were two for the forthcoming 1959 National Technical Conference in San Francisco, Sept. 7-11, causing the South Pacific Region to forego its conference. That of the Intermountain Region is reported here. It was held in Denver, May 11-12. But the Pacific Northwest Region meeting, at Banff Springs in Alberta, was held May 26 to 28, too late to meet the printing deadline for this issue. Hence it must be reported next month.

"ONE hundred years of lighting in Colorado" was a particularly appropriate opening for the sixth annual Intermountain Regional Conference of the Illuminating Engineering Society, held in Denver, May 11-12, under the chairmanship of A. E. Fleming, General Electric Supply Co., Denver, regional vice-president. The introductory review of the many pioneering firsts in lighting from that region, given by Harold Rankin, Public Service Co. of Colorado, set the tone of the conference.

Among them he told of the nation's first electrically lighted home in Cheyenne, Edison's early use of the Shoshone hydro plant in his experiments, invention of low-voltage switching of lights by the Sechrist Co., institution of outdoor Christmas lighting, first mercury street lighting in Pueblo and Denver, first commercial promotion of fluorescent lighting, first school lighting by fluorescent, one of the first high-frequency lighting installations at Albuquerque, etc. The region has a record of daring and initiative in the use of all forms of lighting.

Putting on a "Castro" beard, really intended to go along with the pioneering spirit of Colorado's Rush to the Rockies Centennial celebrations, IES President George Taylor, Day-Brite Lighting Inc., New York, called for new conquests of the frontiers of illumination.

"We are not making ourselves heard by enough people in the United States and Canada. If we don't get the information (IES standards) out, our mission is not being accomplished. We are not getting it out to the lighting industry or beyond the industry generally. Only 20% of the lighting now meets our past recommendations – note I said *past* recommendations. On that basis only a fraction of it meets our present recommendations (in the new IES handbook, third edition).

"We must obtain acceptance of our new lighting levels. This can be done through magazines, the press, Parent-Teachers' associations, professional societies, any avenue that will reach those who will specify or demand better lighting.

"When we get the story across we know that no one can afford not to put in good lighting."

He cited the example of a tool company that paid $20,000 for new lighting levels. The result was savings of $6,800 a month achieved through increased production, lowering rejects and fewer accidents.

He said a retail sales store increased sales 20% by a 3% added cost in lighting.

Improved street lighting on an important highway in Kansas City, Taylor said, cut the frequency of injury accidents from 52% to 40%.

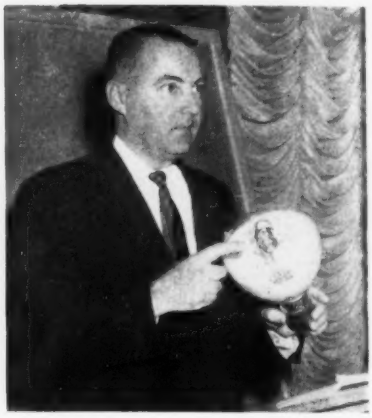
Taylor said, "There has been criticism that we have been proposing too high levels of illumination. These recommendations are the results of scientific approaches by many researchers. They are not wild guesses. Remember, too, these are minimum levels. . . . Our neglect has been in not taking and using what we have available from these researches (eq). We should get 100,000 copies at least of the IES handbook into the hands of people who specify lighting."

For no given reason the paper on Electroluminescence, to be given by Harold Brandt of Westinghouse, Denver, was not presented, and President Taylor made his address at that period. He was preceded by a summary of the 1958 IES Progress Report, a review of new lighting media, fixtures, installations and instruments of that year. It was presented by E. A. Linsday, General Electric Co., Cleveland.

Lloyd S. Reed, Rocky Mountain Section chairman, conference host, with A. E. Fleming, Intermountain Region vice-president, the conference chairman

J. J. Neidhart of Miller Co. who told how quality must be assured if the new quantities now recommended are attained

Truer perception of color differences under higher levels was demonstrated by Robert R. Wylie of Sylvania Electric



A self-ballasted lamp combining filament, mercury and fluorescent was explained by Herbert A. Anderson of Duro-Test Corp.

In presenting the "Quantity and Quality Requirements of Lighting" (a paper given at last year's convention), J. J. Neidhart, manager of application engineering, The Miller Co., Meriden, Conn., reviewed portions of the new edition of the IES Handbook, recently off the press. In speaking of the higher quantities he warned, "The quality of lighting must be raised along with the quantity. The criticism of too much light is not valid. It only means that the quality has not been raised accordingly with the intensity . . .

"A 100-f-c installation costs a company no more than its 10-minute coffee break . . .

"There is no better investment than industrial lighting of the right quantity and quality. A 200-f-c industrial installation costs less than 2% of the annual total wage and capital investment.

"Nothing equals lighting for return on investment. The benefits include fewer accidents, less rejects, higher morale of employees and higher production."

Describing a light source that combines an incandescent filament, a phosphor coating and a high-pressure mercury arc tube in one lamp, Herbert A. Anderson, vice-president in charge of engineering for Duro-Test Corp., presented a paper given at the last IES national conference by Herbert S. Strauss and Wolfgang E. Thouret. Furthermore it is a self-ballasting lamp. Its text has been printed in the society's magazine.

The new recommended higher intensities came up for scrutiny again in another presentation, that of Robert R. Wylie, Sylvania Electric Co., Salem, Mass. In demonstrating "Seeing Color Under High Intensity Illumination" with a portable color box and means to achieve various levels of light, he declared that research has shown that, as levels go up to higher intensities, the eye makes adjustments — in effect, color correction.

Addressing the first day's luncheon was Prof. John Kraehenbuel of Colorado College, Colorado Springs, one of the few men in the nation honored as a gold medalist by IES. His talk was upon the Professional Engineer and the ethics and standards of the profession.

Eugene Pauly, G-E Co., Danville, Ill., concluded the first day's meeting with a discussion of ballasts and with some predictions of what the ballasts of the future would be like when present day "bugs" have been driven out.

After a brief talk on maintenance of modern fluorescent lighting equipment by James Watson of Fluorescent Maintenance Co., Denver, the contest for the regional winners of the "My Most Interesting Lighting Job" contest was conducted.

The winners in the "My Most Interesting Lighting Job" contest were Mrs. Vivian B. Hamilton, an El Paso, Tex., interior decorator, and Fred Rosenquist of Public Service Co. of Colorado.

Mrs. Hamilton, an interior decorator belonging to the New Mexico IES chapter, won the residential lighting contest. She used portable fixtures and lamps for lighting the residence of an El Paso couple who would be moving within three years and wanted to have good lighting without leaving it behind when they moved. Second place was awarded Mary Douglas, Southern Colorado

Jim Buck, past v-p, with E. A. "Red" Linsday, Nela Park, who gave the IES Progress Report of 1958 in compact review

Fred E. Guth of St. Louis, of Guth Lighting, and Glen Gaer, former Rocky Mountain Section chairman and manufacturers' representative

Power Co., for lighting of a bathroom.

Rosenquist, winner of the residential award last year, won the commercial division for his lighting of a women's apparel store in Cheyenne, Wyo. A. W. Boehning Jr. of Albuquerque, N. M., was second and E. D. McCann of Southern Colorado Power was third.

Rosenquist said his problem was to provide "an attractive environment for a women's apparel shop on two levels and overcome the bargain basement atmosphere in the lower level."

"Large Parking Area Lighting" was the subject of Wallace Weld, Revere Electric Mfg. Co., Chicago. He described in words and with pictures many such installations.

From a company that has primarily been associated with glass came a talk on "Control of Light With Plastic."

Gene Rae, the Holophane Co., New York City, in his talk said his company has decided to use acrylics plastics exclusively because of what he said were their good weathering abilities and stability. "We want to be sure that our product looks good 30 years from now," Rae said. He said styrenes are lower in cost "but there is some question of their color stability."

He said three plastics are commonly used in lighting (1) vinyls; (2) styrenes; and (3) acrylics. He said the vinyls can be used for diffusion only. Only the styrenes and acrylics are transparent.

Fred Rosenquist, Public Service Co. of Colorado, winner of commercial division, "My Most Interesting Lighting Job" contest

Mrs. Vivian B. Hamilton, El Paso interior decorator, winner of the residential division contest. There were three entries

"If plastics have any place in lighting," Rae said, "it is in the large dimensions." If only a small transparent piece was needed for a light "it might as well be glass."

Transparent plastics, he said, "are admirably suited for use with 100-200 f-c and in some special cases they work well in controlling 500 f-c. They are not yet suitable for 1,000 f-c. The plastics are ideal light-controlling devices and we see a wider and more extended future use."

The second morning's sessions concluded at 11 a.m. so that all could make a tour of the Martin plant. Following this the president's banquet and dance was held at the Continental-Denver Hotel. At this President Taylor made a brief talk and Regional Vice-president Gene Fleming was his usual witty, entertaining self as master of ceremonies. Total registration at the conference was 97, a new high for the region.

Chairmen of the region's sections and chapters took turns presiding over the several sessions. These included Lloyd S. Reed, Rocky Mountain Section, host section; William Stultz, Southern Colorado Chapter; Bob Godemann, Arizona Section vice-chairman; J. Homer Shaw, Utah Chapter vice-chairman; and A. W. Boehning Jr., New Mexico Chapter.

In charge of conference arrangements was a large committee headed by Hugh McCulloch, Independent Testing Laboratories, Boulder, as chairman.

1959 National IES Conference to be in San Francisco

A technical program packed with important papers by national authorities is about to be released to the members of the Illuminating Engineering Society together with particulars as to making hotel and entertainment feature reservations for the 1959 National Technical Conference, to be held in Hotel Fairmont and the Mark Hopkins in San Francisco Sept. 7-11. It is a strong program in the field of photometry, lighting applications, research, calculations, light sources, street lighting, residential lighting.

The social program for members and their wives is especially attractive, beginning on Saturday evening, Sept. 5, with a hunt dinner for those who will go salmon fishing in the morning out the Golden Gate. It includes scenic boat rides of the Bay for the ladies, a Chinese fashion show in Chinatown, a wine country tour and a barbecue for the evening of the golf tourney.

Among the features is the annual progress report in which a review of new light sources, fixture designs, and lighting applications are illustrated and demonstrated. Another highlight of the conference will be the finals in the nation-wide "My Most Interesting Lighting Job" contest in both the commercial and residential classifications. The winners of all of the regional contests will try for the national first, second and third awards.

To give a brief idea of the scope of technical subjects to be covered there will be:

Applications—How to attain both the new high levels with low brightnesses, integration of air conditioning with lighting, polarized light applications, new uses of electroluminescence, wide-range dimming of fluorescent.

Photometry—Measurements of direct sunlight effects on models, effect of brightness and color patterns on measurement. *Calculations* by means of computers.

Light Sources—New designs of mercury lamps, Rhenium in incandescent lamps, optimum frequencies with fluorescent, electroluminescent progress, problems of high brightness, new high pressure, high brightness lamps, silica coatings, etc.

Street Lighting—Improved mercury lamp transformers, highway tunnel lighting, comfort evaluation of roadway lighting.

A residential lighting forum.

NWPPA, engineers hear Jack Stevens oppose California sale of NW Power, recommends . . .

Storage in Canada

THE Pacific Northwest should earmark its surplus hydroelectric energy for three proposed Canadian projects rather than sell it to California, the engineering and operations section of the Northwest Public Power Assn. was told at its workshop, April 9-10 in Ephrata, by Jack Stevens of Seattle, consulting engineer for the Puget Sound Utilities Council.

"If the power goes to California for fuel replacement only, we can probably curtail such deliveries later on," Stevens declared. "If, however, surplus power goes to California to supply irrigation, domestic or industrial loads, our chances of curtailing such deliveries are remote indeed."

Stevens cited several instances where Canada delivered surplus power to the United States with the expectation it could discontinue such deliveries when the power was required at home.

"I don't believe there has been a single instance wherein Canada has been able, in the light of good national relations, to cut off these deliveries," Stevens declared. "Unless handled very carefully, Canada's experiences with the United States could be repeated in the Northwest's dealings with California."

The Canadian projects that Stevens believes will firm up surplus power in the Pacific Northwest are the Peace River development and the Mica Creek and Arrow Lake Dams on the Columbia River.

"Of particular interest to all the utilities in the Northwest is the storage drawdown period of the 15,000,000-acre-ft Peace River reservoir," said Stevens. "The dam will provide complete regulation of the Peace River and can therefore maintain storage space indefinitely. The storage drawdown period can be something like 20 years. This means that Northwest utilities will be able to store surplus energy in the Peace River reservoir and have it generated out at the end of one week, one year, five years or whenever it is needed."

With present reservoirs, Stevens pointed out, surplus power can be stored only for about nine months and vast amounts of energy are wasted.

Present arrangement for storage in Pacific Northwest reservoirs is for the utility doing the storing to pay the owner of the reservoir one mill per kilowatt-hour when that energy is generated out for use in the load.

"On the same basis, we would be able to store unusable secondary in the Peace River reservoir and have it returned to us as firm energy at a cost of one mill per kilowatt-hour," Stevens said. "That would indeed be a bargain."

In another talk, R. H. Schneider, substation design engineer for Tacoma City Light, told how his utility decided to purchase a mobile substation, both for maintenance and for use as a spare transformer.

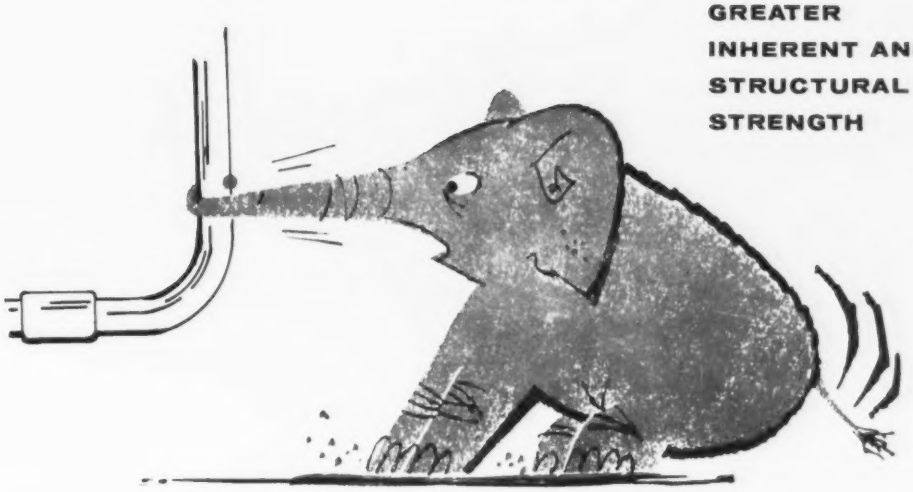
Faced with the need of installing two new substations, one 7,500 kva and the other 12,000 kva, and with no spare transformers available, Tacoma City Light determined it would save $65,000 by buying three-phase transformers in place of two banks of three single-phase transformers and two spare transformers.

Schneider pointed out that use of a mobile substation for emergency purposes would enable the city to combine its spare transformers with new transformers of the same size, providing additional banks at considerable savings.

"It was found that a 10,000-kva bank, a 4,500-kva bank and a 3,000-kva bank could be provided at a saving of $97,000 by utilizing the spare transformers," Schneider said.

Maintenance costs at 68 Tacoma substations would be reduced $76,000 annually using the mobile, Schneider estimated.

"Maximum size of the bank is limited only by the load limit of the



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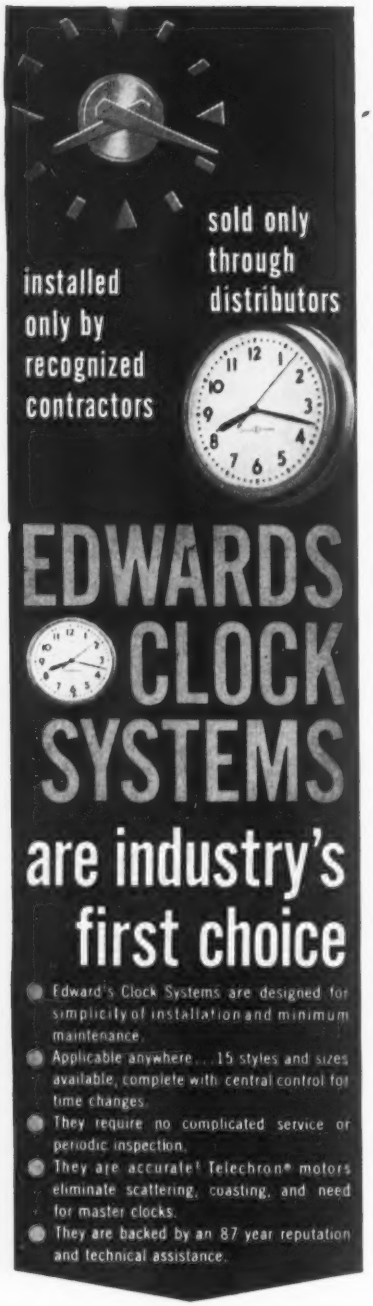
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roads upon which the transformer is to travel," said Schneider.

The Tacoma City Light mobile unit is a 10,000-kva, 105/52.5 kv-13.8Y/12.47Y/4.16Y-kv unit that can be used to replace all but two distribution stations on the system.

"Cost of a mobile substation varies from $11 to $20 per kva depending on the size of transformer, voltage and amount of relaying and metering specified," said Schneider. A tractor and driver can be provided by a local transfer company for approximately $80. This covers both the installation and removal of the equipment."

Schneider recommended that smaller electric utilities consider a small mobile unit that could be mounted on a four-wheel trailer and be towed to its location by the utilities' regular line trucks.

Fred H. Lehman, chief engineer for the Clark County PUD, speaking on "Comprehensive Development of Rights-of-Way," contended that the multipurpose concept which governs the construction of dams also should be applied to land and public rights-of-way.

"The public that pays for and uses the highways is the same public that pays for and uses utilities, he pointed out. "If locally owned utilities are forced to pay for moving their facilities whenever changes to our national highway system make it necessary, the soundness and the economies of this multipurpose concept no longer apply. Footing the bill for the cost of moving facilities seems to be strictly a one-sided proposition. If utilities have to move on account of highway modification, the utilities are expected to pay and you can rest assured if a highway has to be relocated on account of utility construction, the utility pays also."

"Until the multipurpose feature of our right-of-way usage is more generally accepted, we in Clark County will continue to locate our lines on private property whenever and wherever possible. This policy gives us additional distance from the traveled way and by doing so reduces the exposure to traffic. It also puts the poles outside the work area of the road contractor. The last but by no means the least reason is that we are assured of being reimbursed if a line should have to be moved in the future."

The workshop drew an attendance of 185 from 41 utilities. John E. Scofield of the Eugene, Ore., Water & Electric Board was advanced from vice-chairman to chairman of the section and Bill Fell of the Clallam County PUD became vice-chairman.

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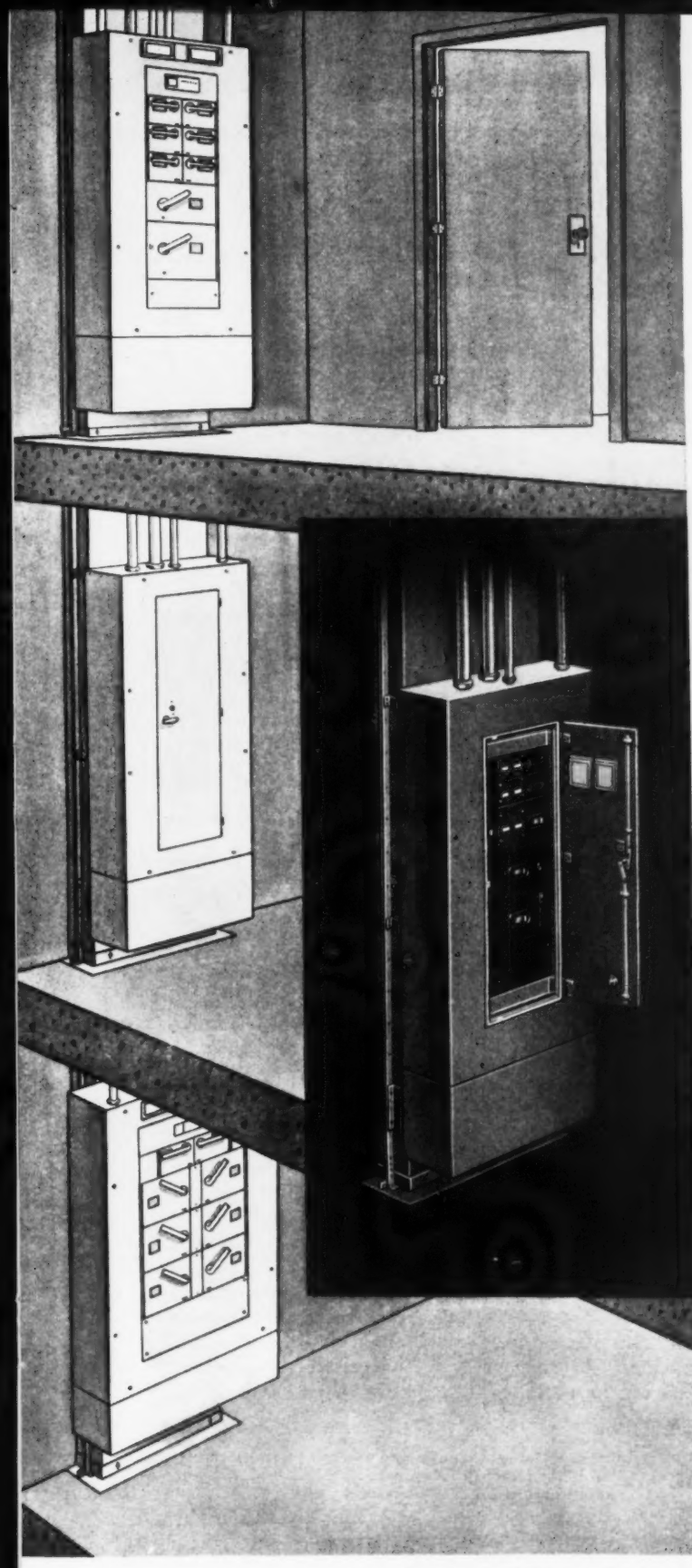

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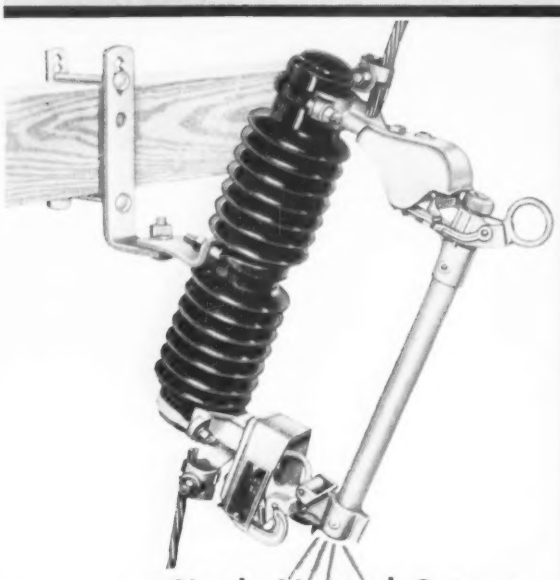

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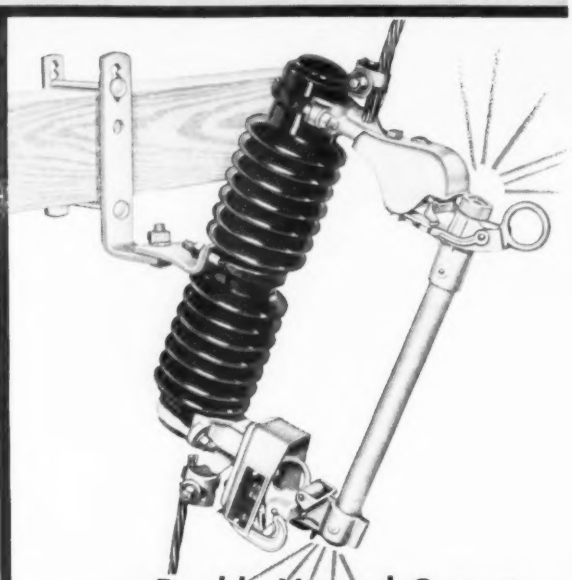

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The top of the expendable cap, which seats against the fuselink buttonhead, is frangible, and tears out when pressure inside the fusetube approaches a value that might burst the tube. A mechanical link ejector makes doubly sure that the "F2" operates on low fault currents. This link ejector is vitally important to load break operation.

Here is a cutout to meet the needs of your present system and that will continue to protect your system of tomorrow. The Chance "F2" is available in 5.2, 7.8, 15 and 27 KV, and in 100 and 200 ampere ratings, with interrupting capacities as high as 12,000 amps. Advanced engineering features of the "F2" include: A positive latch, to prevent the cutout from coming open under vibration or shock . . . versatile, parallel-groove type terminals that give positive high-conductivity connections . . . and anti-corrosive bronze sleet hoods to completely protect the vital contact areas.

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Chance Link-Break Tool acts as a portable load break lever—makes any "F2" Cutout a load break cutout. You get a FREE Load-Break Tool with every order of 100 or more "F2" Cutouts. Offer expires October 31, 1959.

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Utah's Contractor License Director John H. Chase (right) told the electrical inspectors meeting that one state license would suffice for the entire state for a contractor, so that separate licenses in cities would not be needed. If cities needed fees for operating inspection, he said, they should only pass ordinances for permit and inspection fees, not licenses. The state's examinations for electrical licenses have been developed by a committee from the electrical industry.

Chase

Wage demands continue to be large. San Diego's local 569, IBEW, asks for a 50¢ per hour increase to give electricians the same wage for a 4½-day work week, also demanded. The scale was already $4.10 per hour. . . . In Los Angeles negotiations have started also but just what the demands are has not been announced. They are likely to be similar to the San Diego situation. . . . Meanwhile Portland has settled with Local 970 for 10¢ an hour increases each six months on a three-year contract, a readjustment of travel provisions. . . . While negotiations in Pocatello, Boise and Grand Junction were completed with a manpower training program included, Salt Lake and Ogden were to begin talks on theirs . . . Oakland is still deadlocked.

Flashbulbs may cause R. K. Williams (right) to close his eyes but he won't close them to any code violation. He is chief inspector for Salt Lake County under its new ordinance requiring electrical inspection there.

Williams

An electrical contractor, Charles Wikle, Schulman Electric Co., Los Angeles, was elected president of the Pacific Coast Electrical Assn. at its annual convention in San Francisco, May 22. He has been a director of it and of the Los Angeles Chapter, NECA, for many years.

Three well and widely known old-timers died recently—In Salt Lake City Ernie E. Brazier, 74, who retired from G-E Supply after years as manager in Denver and Salt Lake and then served as Intermountain Electric Assn. manager for awhile, died following an operation, May 7. . . . In San Jose pioneer contractor M. L. Rosendin, over 40 years in business there, died May 8 after an operation. . . . In Los Angeles Frank J. Airey, in early days manager of G-E Supply there, and for many years an agent for manufacturers, principally Wiremold Co., died May 3, after a short illness. Both he and Mr. Brazier had been with Pacific States Electric Co., later to become G-E Supply.

Karl Stolting, Santa Rosa electrical contractor can show his own office as an example of 200-f-c lighting from a luminous panel ceiling. On the wall are switches to turn on different levels to demonstrate to customers. (Right)

Stolting

Idaho State electrical inspectors were all present at Idaho Chapter, IAEI, meeting at Blackfoot April 22 and many were elected to office in the chapter. At left, standing, are: Fred Vogt, Blackfoot, past chairman; A. M. Kopeland, Lewiston, first vice-chairman; Gaylord Dennison, Boise, secretary-treasurer; H. E. Baker, Kellogg; seated—A. L. Callow, St. Anthony, second vice-chairman; J. R. Wymer, Parma; Mark Lundy, now chief inspector, Boise, former secretary; and L. G. Nelson, new chairman of the chapter, Buhl. Many are retired utility men.

Guibara

Aluminum—both wire and conduit—was given such an enthusiastic boost in this copper country by Leon Guibara of Kaiser Aluminum, who even wore an aluminum screen cap, (left upper) that veteran Les Johnson, General Electric, Salt Lake, countered by wearing a steel soldier helmet and reminding that for ultimate protection the army did so too. . . Inspectors, at the meetings reported on pp 88-90, showed concern only whether aluminum conduit would support ice loads if used for service entrance periscope masts.

Inland Empire Chapter of National Industrial Service Assn. elected Gordon Thoms of G. O. Thoms Electric Co., Spokane, as its first president. The chapter was only recently organized. Eldon T. Strom, Strom Electric Co., Troy, Idaho, was named vice-president; and K&N Electric Motors, Spokane, secretary.

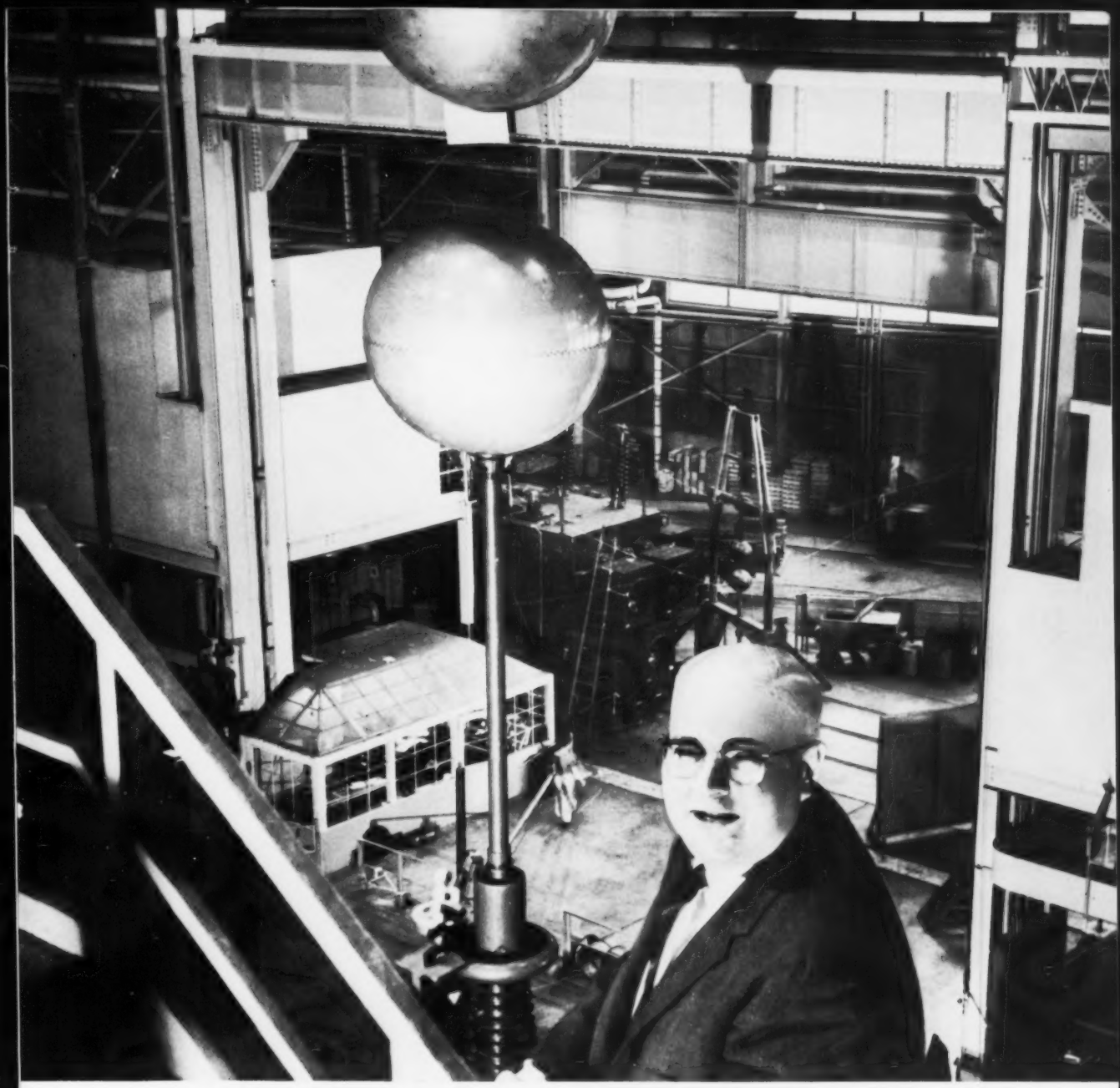
Electrical Industry Bid Depository of the Bay Counties Inc. held its first annual meeting in Berkeley April 8 and elected directors and officers on May 5. William Nagel, A. Neri Inc. of California, was named president; Joe Barnes of V.G. Electric Co., Richmond, vice-president; E. M. Buttner, Scott-Buttner Electric Co., secretary-treasurer; and Harold Pierce, Hal Pierce Electric Co., Vallejo, on the executive committee. Thomas J. Ryan is administrator, and reported increased membership and use of the depository by the building industry. A meeting of officers of all bid depositories in California was called by Ryan and held May 15 at the new bid depository in Los Angeles, of which Al Slater is administrator.

Johnson

Matt Sherwood and Charles Hart have been appointed by NECA's Executive Vice-president Paul Geary to gather labor unit data in the field to speed up revision of the NECA manual of labor units and to bring it up to date on new materials such as aluminum wire and conduit, luminous ceilings, etc.

Revisions to make AB-1358 more acceptable as a law to set up professional standards for electrical, plumbing and building inspectors were given a public hearing May 19 by a legislative committee in Sacramento.

National Association of Lighting Maintenance Contractors met in Denver, April 27-29 and Robert Watson of Denver was elected regional vice-president. A hassle over whether to restrict membership or open it up enlivened sessions, which dealt mainly with maintenance methods and economics. The new 40-w, 3,100-lumen, rapid-start lamp was first shown.



Mr. John C. Rissinger, Sales Manager, Power Transformer Department, in test center where Westinghouse studies today the problems which electric utilities will face tomorrow.

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Giant research test center creates dollar-saving transformer Bonus Values

America's tremendous electrical growth has generated many problems for the country's electric utilities . . . problems of handling larger blocks of power, achieving more economical transmission, maintaining customer good will.

The Westinghouse Power Transformer Department is proud of its contributions toward helping utilities meet their current and long-range problems. From the research facilities at Sharon have come developments that have brought the industry installation, maintenance, operating and performance savings. These are the actual dollar benefits—the Bonus Values—found in new developments from the Westinghouse Power Transformer Department. These developments have been made possible through Westinghouse Plowback of Earnings into research and development.

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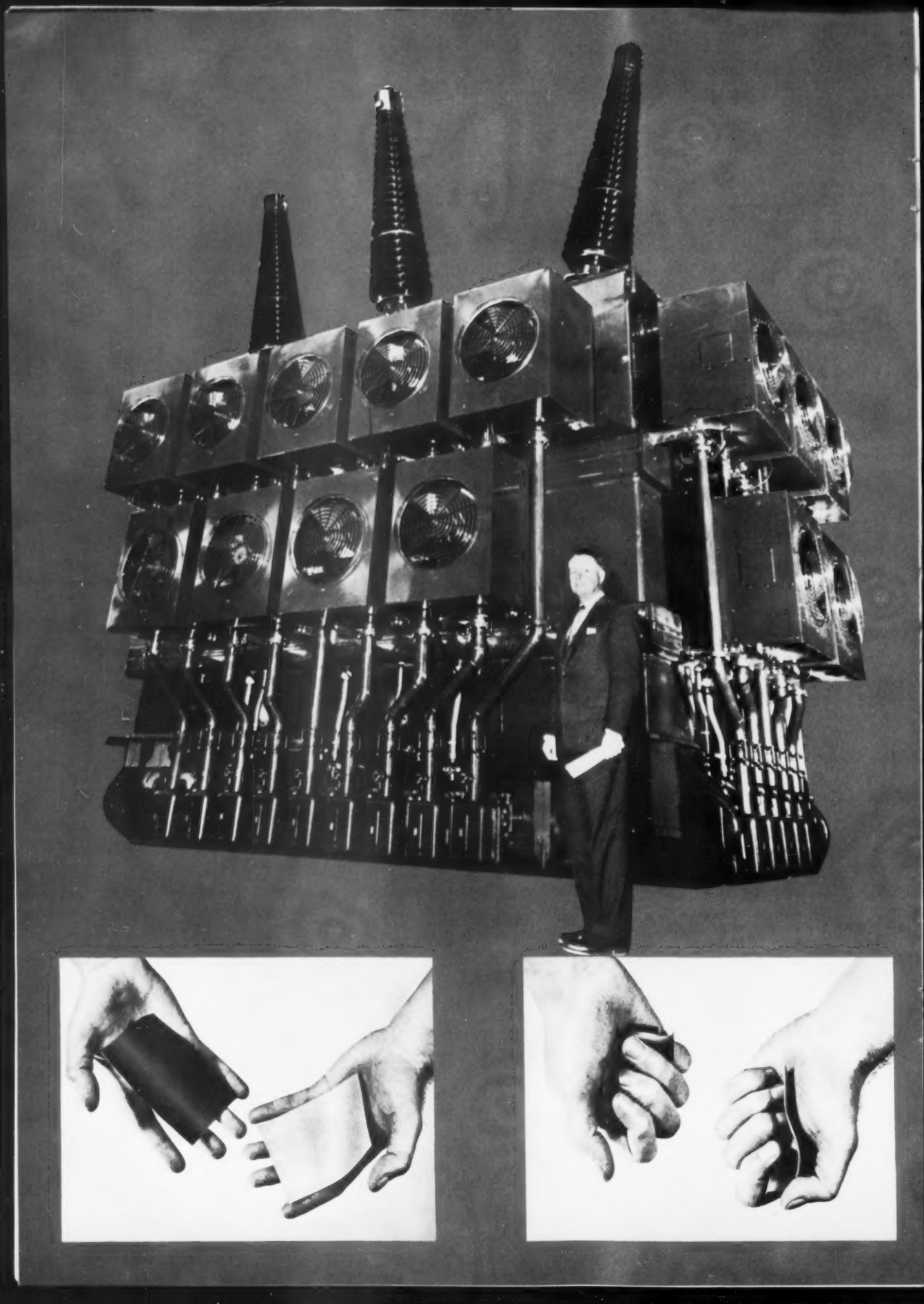

The Insuldur system knows no bounds, as pointed out here by Mr. M. E. Fagan, Manager, Westinghouse Power Transformer Engineering Department, shown with a 345-kv, 275,000-kva, 3-phase Westinghouse power transformer with Insuldur insulation system.

INSULDUR SYSTEM ADDS 10% EXTRA OVERLOAD CAPABILITY... SAFELY!

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No matter what your present overload practice, the Insuldur-protected Westinghouse transformer can carry 10% more overload than any other transformer built . . . with no additional loss of insulation life.

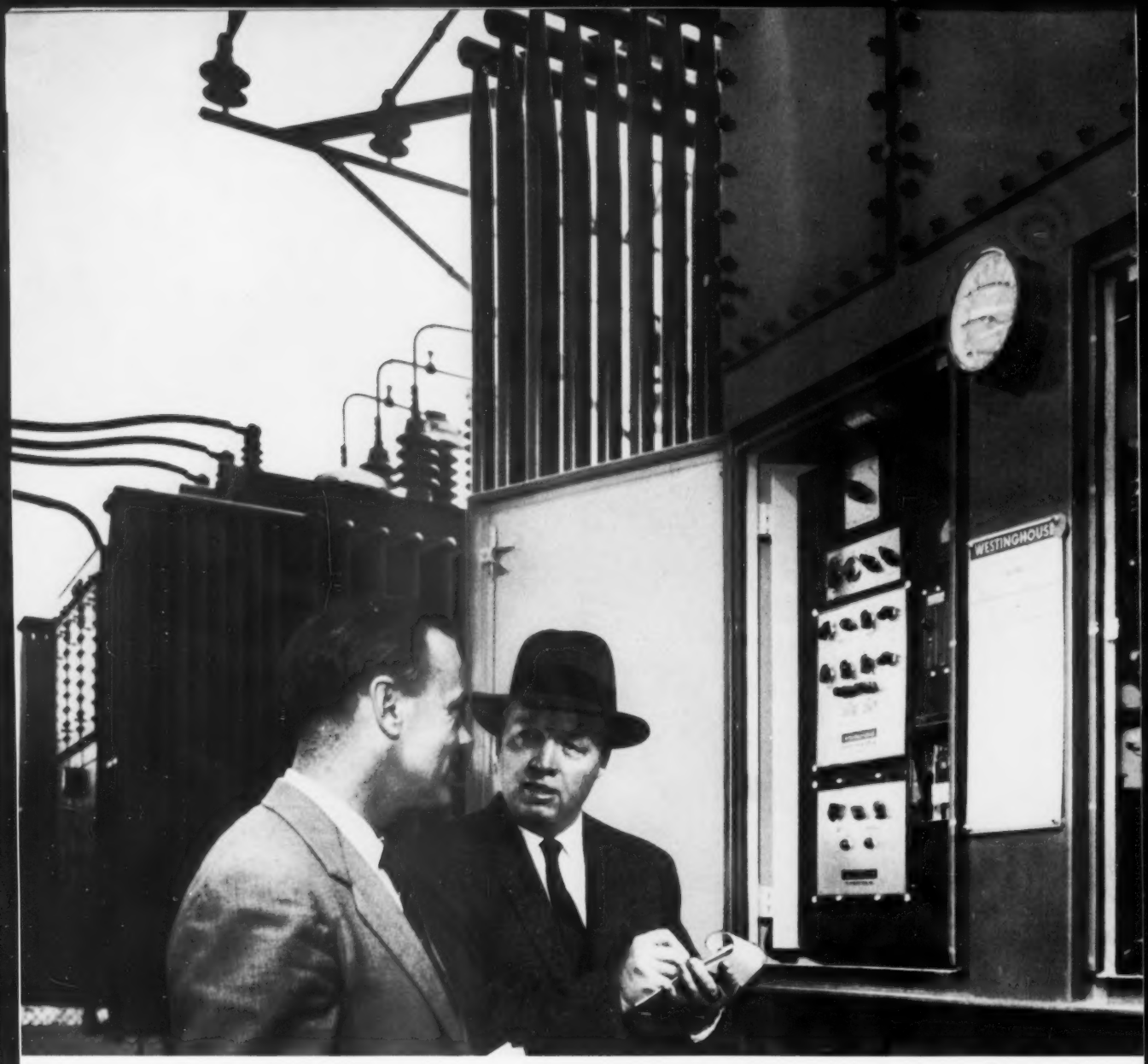
Here is your means of allowing more overload—and obtaining more revenue—economically . . . and safely. For example, if you can economically justify overloading an ordinary transformer 125% for 24 hours, an Insuldur-protected transformer can be overloaded 135% for the same time—with no extra loss of insulation life.

The exclusive Insuldur system now protects all Westinghouse power transformers —large power, substation, network, CSP* power and mobile substations.

Ask your Westinghouse representative about the Insuldur-system protection for all power transformers. He can show you the "Crumble Test"—dramatic proof of added insulation strength.

*Trade-Mark

The "Crumble Test" shows superior heat-aging resistance of exclusive Westinghouse Insuldur-system insulation . . . proves that overload conditions endanger the life of ordinary insulation. During overload tests, ordinary insulation has charred, crumbled and "died", Insuldur-system insulation has bounced back . . . stayed "alive" . . . providing safe, extra overload capacity.



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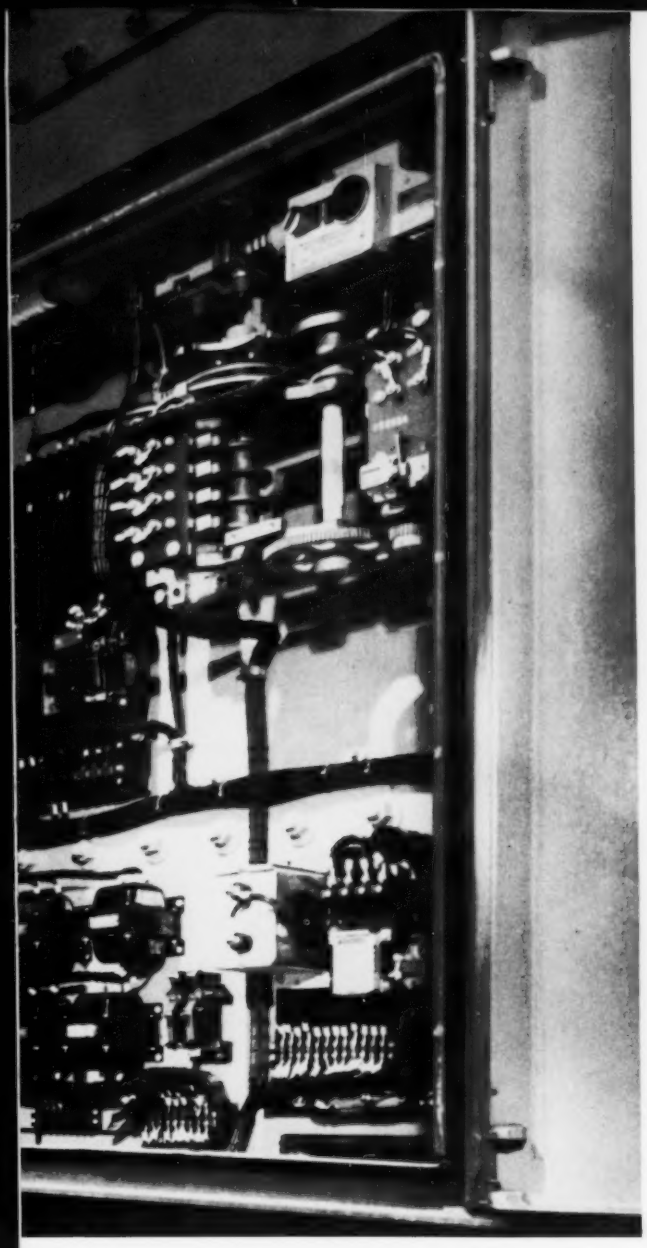
Since the introduction of Magamp control just three years ago, over 1200 units have been supplied for load tap changing equipment placed in service by electric utilities. Today, these Magamp units continue to deliver trouble-free performance after a total of over 83,000,000 tap changer operations.

Magamp means trouble-free, maintenance-free service under all conditions when used on a station-type voltage regulator, an LTC transformer or a CSP power transformer.

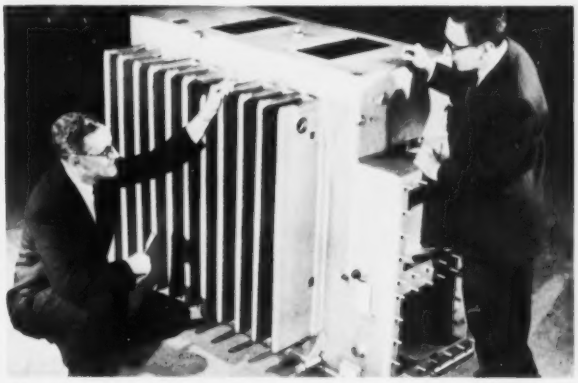
Magamp control is completely static. There are no moving parts to clean and adjust, no contacts to check and burnish, no relays to be rebalanced. Magamp control settings are all electrical . . . and the "set-and-forget" control never needs adjustment.

The Westinghouse load tap changer is another important factor in providing low-cost regulation, with minimum maintenance. Its direct-drive Geneva gear mechanism assures optimum speed of moving contacts to prevent burning. It provides shockless acceleration and deceleration, has been tested to eight million operations with no appreciable wear. This means extra years of contact life.

Westinghouse offers an exclusive 20-year prorated warranty on contact life for URS tap changers—regardless of the number of operations.



Mr. Don Ralsten, Westinghouse sales engineer, and Mr. John Harrell, Manager, Westinghouse Network and Regulator Sales, review the moneysaving advantages of Magamp control in this LTC substation transformer on the system of a progressive midwestern utility.



Mr. J. C. Gardner (left), Westinghouse network transformer sales, and Mr. G. A. Monito, network transformer engineering, discuss the improved tank construction of the new Westinghouse universal design network transformer.

Maintenance-free Magamp control and 20-year minimum tap changer contact life

Ask your Westinghouse representative to show you how Magamp control and the direct-drive tap changer combine to improve your power distribution economics, with reduced regulation and maintenance costs . . . a double dollar-saving Bonus Value made possible by Westinghouse Plowback of Earnings into a continuing program of research and development.

NEW SPACE-MISER NETWORK TRANSFORMER ADDS FLEXIBILITY, CUTS MAINTENANCE

New Westinghouse universal design for Space-Miser network transformers can be used in either vault or subway applications. This single design replaces the two designs formerly necessary. Stocking is now greatly simplified; a utility which has had to maintain stocks of spare units for both applications now can stock only units of this universal design, and inventories can often be substantially reduced.

Save on maintenance, too . . . The coolers are now made of heavy copper-bearing steel. This new design provides better protection against corrosion. The number of welds has been reduced by 30%; the welds in the cooler area are made by an automatic welder, giving smoother, more uniform welds which permit better paint adhesion, better protection in these critical areas.

The new Westinghouse Space-Miser with universal design retains all of the advantages of the standard Space-Miser construction—small size, round-cornered tank and Yukon coolers.

Ask your Westinghouse representative for the full story of the new universal design network transformer—available in ratings of 300, 500, 750 and 1000 kva at 5, 15, 25 and 34.5 kv.

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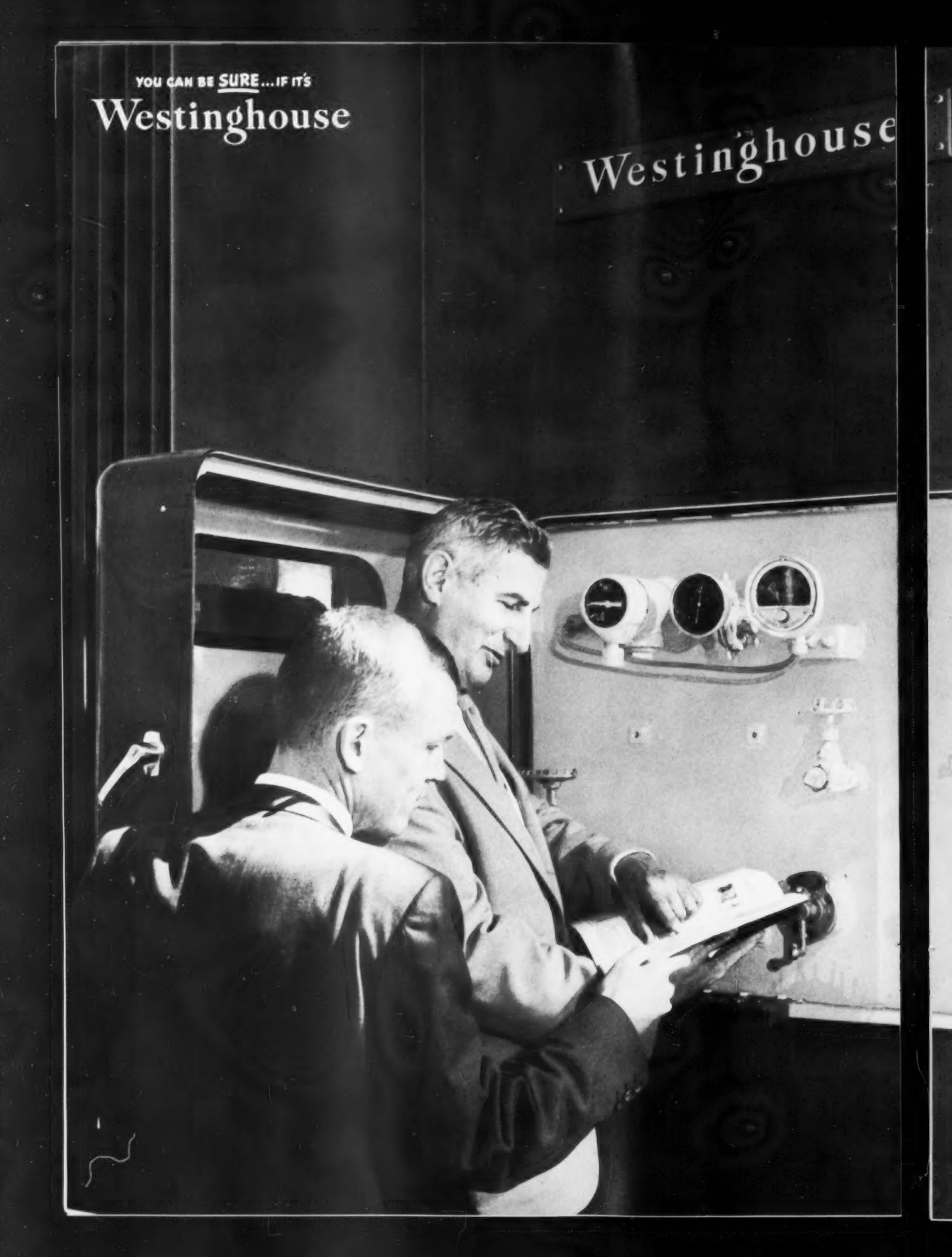
YOU CAN BE SURE... IF IT'S
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Westinghouse

In photo at left, T. A. Kraft (right), Budget and Application Engineer, Ohio Edison Company, with Westinghouse representative S. S. Waters, as they analyze a spec for one of the new features of the redesigned Westinghouse substation transformer. Below, Messrs. Kraft and Waters at installation site of the new, streamlined Westinghouse unit now in service at Ohio Edison's McKnight Substation in Akron.

IMPROVED APPEARANCE, LOWER SOUND LEVELS BUILD BETTER CUSTOMER RELATIONS

...."Better Neighbor" Bonus Values created from Westinghouse earnings reinvested in development. This new line of Westinghouse substation transformers meets the electric utilities' needs for more attractive, quieter transformers to be located in residential areas. Streamlined and uncluttered, these new units will reduce complaints of unsightliness from your customers. Here's how appearance has been improved:

- Rounded-corner tank permits better paint adhesion and coverage, stops ugly corrosion before it starts.
- Elimination of external braces takes away other sources of corrosion, prevents debris trapping.
- Randomly scattered gauges and valves have been relocated in a weatherproof enclosure conveniently placed at eye level.

This all adds up to better appearance, better customer relations . . . and because many possible target areas for corrosion have been eliminated, these new transformers will reduce maintenance costs, too.

The lower sound levels of these new substation transformers are another step toward better customer relations, are expected to reduce the "noise" complaints of your customers. In many cases, there will be a direct dollar-saving benefit to utilities—no costly sound dampening barriers and enclosures.

Your Westinghouse representative will be happy to tell you the full story of this new line of streamlined, quieter substation transformers.

HOW WESTINGHOUSE IS SAVING ELECTRIC UTILITIES MILLIONS OF DOLLARS...

These seven Bonus Values, created through the years by Westinghouse, continually save millions of dollars in installation, maintenance and operating costs:

- **Reduced Sound Levels**—Westinghouse power transformer sound level reduction—saves up to $17,000 on original cost.
- **Inner-Cooled Construction**—Space and weight reduced up to 15%, with lower impedances and improved performance.
- **Vapor Cooling**—Westinghouse V/g transformers combine dry-type safety with the capacity and BIL of liquid-filled units.
- **"Form-Fit" Construction**—Westinghouse power transformer construction has for years been outstanding for high mechanical and dielectric strength.
- **Shipping by Schnabel Car**—Extra "room-to-grow" for future transformers; even supervoltage transformers can be shipped in one piece.
- **Standardized Condenser Bushings**—Westinghouse bushings set industry standards for fifty years, needed no design change to meet new ASA standards.
- **Forced-Oil Cooling**—Another Westinghouse-pioneered concept, forced-oil cooling has saved electric utilities over $100,000,000.

These and other developments created by Westinghouse research continue to provide the equipment to meet America's growing power needs—economically.

J1-70900

YOU CAN BE SURE...IF IT'S Westinghouse

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS"
CBS TV MONDAYS

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

One Battle We're Losing —And Why

Lest it seem self-serving, we of McGraw-Hill, as publishers, have hesitated to make the following statement about the "Battle of the Books." However, our reticence has been overcome by our conviction that it is greatly in the national interest to have much wider public understanding of the nature of this battle. This conviction is strengthened by the fact that many, not in the publishing industry, believe in the importance of this battle and, further, by the fact that it is a battle which the United States is losing.

The United States is losing an important battle — a battle of knowledge and ideas, waged with books. It does not have the excitement of competition in scientific achievement, nor the urgency of a diplomatic crisis, nor the obvious economic significance of a struggle for export markets. But our success or failure in this battle of knowledge and ideas may well have a decisive bearing on these more spectacular aspects of international rivalry.

The Russians know this. About a decade ago, they started a program to build up their export of books, the most durable and penetrating way of communicating knowledge and ideas. **By 1957 the Soviet Union was exporting 30 million books, one-and-a half times as many as the United States.** Many of these books are printed in English, and all are in languages of the non-Communist world.

In the languages of the Near East alone, the Russians printed and distributed 413,600 books in 1957, as compared with 166,415 in 1956. In India, Russian textbooks on engineering are to be published in English under a technical aid agreement signed in Moscow last December.

"Trade Follows The Book"

Books are in the advance guard of the Soviet political and economic challenge to the free world. With books go ways of thinking — about government, about education, about management, about science and technology. If these books do their job effectively in the training of those who will become a nation's leaders, they will provide the basis for political and cultural understanding and also, in the future, for trade.

The Russians are not the first to discover this relationship. Britain, which lives by trade, has traditionally exported more of its book production than any other nation. Today it exports one book in every two produced. The British have a favorite dictum: "Trade follows the book." They have proved its accuracy. Now the Russians are trying to make this same principle serve their purposes.

Where does the United States stand in this competition for men's minds? In number of books, it trails far behind the Soviet Union — exporting roughly 20 million books, against the Russians' 30 million. As a proportion of our total output of books, our exports amount to only 10% — against Britain's 50%.

The Russians' Advantage

U.S. book exports have grown in the years since World War II, from approximately $11,000,000 in 1946 to $35,000,000 in 1958 (both figures excluding Canada). But in expanding book exports, the American publishing industry faces two major obstacles:

(1) **The comparatively high cost of producing a book in the United States,** which puts its price well beyond the reach of many students, teachers and businessmen in other countries; and

(2) **The shortage of dollar exchange in many countries,** which means that importers can pay for

books only in currencies that are of little use to American publishers.

The Russians have neither of these problems. Soviet publishing is state-subsidized, and exported books are sold for nominal sums paid in the currencies of the importers. As these books serve the political and economic purposes of the Soviet Union, they are cheerfully sold on giveaway terms.

The American publishing industry, on its own, is making vigorous efforts to increase the distribution of American books in other countries. Leading U.S. publishers and their agents have offices and salesmen in the major countries of Asia, Africa and Latin America. Several publishers have begun to reprint textbooks in Asia at one-half to one-third of their U.S. costs, thus making them available to the students in Asian countries at prices they can more nearly afford. And the American paperback has become a symbol of low cost in popular books. But neither of these devices is practicable for serious cultural, technical, scientific, educational and professional books, which require durable, hard-bound and necessarily expensive editions. Despite their great importance to those who need these books, the demand for them is simply not large enough to warrant low-cost publishing methods.

Government agencies also have increased the availability of American books. The United States Information Agency and the International Cooperation Administration have placed American books in libraries overseas, donated them to educational institutions and presented them to key individuals in the industries and governments of the developing countries of the world. But these programs are small in relation to the need.

A Modest Program

An unusual and little-publicized Government program has helped American publishers overcome the other major obstacle to the export of books — the shortage of dollar exchange. This is the Informational Media Guaranty (IMG) program, administered by the United States Information Agency. It enables publishers of books judged to be worthy of the American way of life to sell their books, for local currency, in countries such as the Philippines, Formosa, Vietnam, Burma, Indonesia, Pakistan, Turkey, Israel, Poland, Yugoslavia, Spain and Chile, which would otherwise be unable to buy these books because of their shortage of U.S. dollar exchange.

The IMG program is not a giveaway. Publishers have to **sell** their books, and customers overseas have to want them enough to **buy** them at full prices. IMG merely guarantees that the exporting publisher receives in dollars the payments he collects from his customers in their currency. The program costs very little in terms of our total foreign aid program, or in terms of what it accomplishes. In ten years it has made possible the sale of $150 million worth of books, magazines and films to countries of key economic and strategic importance at a cost of only $10 million.

The IMG functions through a revolving fund. Foreign currencies are exchanged for dollars, and the foreign currencies in turn are resold to replenish the supply of dollars. The net cost is the small but unavoidable loss on resale of these foreign currencies. Over the ten years of this program, the IMG revolving fund has shrunk from its original $28 million to $18 million, $10 million of which is in unconverted foreign currencies.

If this modest but vitally important program is to be continued, Congress must appropriate the money necessary to rebuild the revolving fund. This would ensure that any country approved by the State Department and willing to sign an agreement to buy American books, at their full price, with its own currency, could do so. Last August, Congress reduced a requested appropriation for this purpose from $7 million to $2½ million. To continue even at its present reduced level, an appropriation of $3½ million is needed. To realize the full potential of IMG, the revolving fund must be restored to its original level.

If the IMG program is not continued, with adequate financial support, some countries whose friendship and understanding we seek today and with whom we hope to build a trading partnership in the future will have to reduce their purchases of American books to a trickle. These are countries where school teachers, college professors, students, engineers, doctors and businessmen need and want to buy American books. The loss will be not only theirs, but ours as well. For it will deprive the U.S. of one of its most effective, and least costly, means of communicating knowledge and ideas and understanding of the American way of life.

This message is presented by the McGraw-Hill Publishing Company to help increase public knowledge and understanding of an important national problem. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT
McGRAW-HILL PUBLISHING COMPANY, INC.

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An all-electric kitchen is just one of the advantages you'll find in a home bearing the Medallion Home award

Every Medallion Home guarantees you:

1. An all-electric kitchen, with major electric appliances such as a modern range and oven ... all part of the basic home plan and price.

2. Full Housepower wiring for present, and future needs to handle the appliances you own today *plus* those you'll want tomorrow.

3. Provisions for proper lighting in all areas where it's needed to insure your family's safety and comfort.

And, for the ultimate in luxury living, there's the **all-electric** home—the Gold Medallion Home with a modern electric heating system such as the amazing electric heat pump that both heats *and* cools.

Always remember ... look for the Medallion award before you buy *any* new home.

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When you install
be sure to use Killark

the *first* and most complete all-

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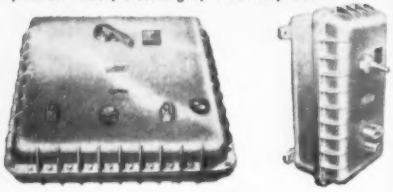
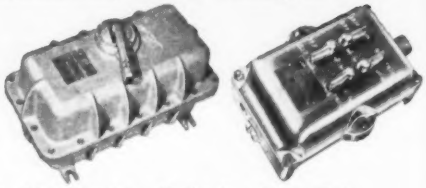
Explosion-Proof, Dust-Tight, Weatherproof



Starters and Combination Starters Made to Order

CIRCUIT BREAKER ENCLOSURES
Explosion-Proof, Dust-Tight, Weatherproof



Furnished Complete with Breaker of Your Choice

JUNCTION BOXES
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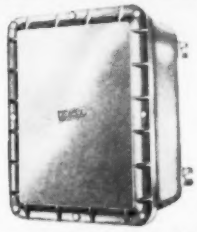

More Than 40 Sizes Custom Hubs

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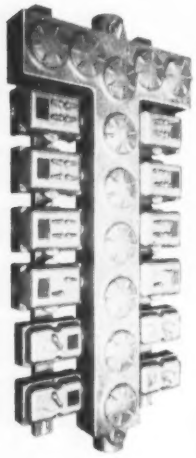

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ENJOY THE *Plus* ADVANTAGES OF A *100%* ALUMINUM INSTALLATION!

- **Lightweightness.** You save labor, cut transportation and handling charges. Aluminum weighs ⅓ as much as iron; one man can handle an all-aluminum installation which may have required two men when other metals are used.
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PULLING ELBOW
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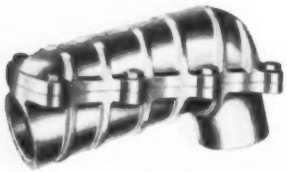
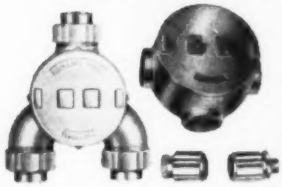


Very Rugged Construction Various Sizes

FITTINGS Explosion-Proof



Complete Line of Fittings & Accessories

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ALUMINUM FITTINGS AND FIXTURES

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Screwcap Style
Many Sizes—Custom Hubs

DUST-TIGHT FIXTURES

Available in
Pendant,
Bracket &
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Pendant,
Ceiling,
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60W to 500W.

EXPLOSION-PROOF FIXTURES

Available in
Pendant,
Bracket &
Ceiling Types.
60W thru 500W.

FLUSH SWITCH FITTINGS
Single thru 5-Gang
Shallow &
Deep Styles

ENTRANCE FITTINGS
Threaded and Speedolet Types

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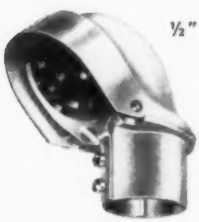

...AND ENJOY THE *Completeness* OF THE KILLARK LINE!

Whatever the installation, Killark can provide the correct aluminum fitting or fixture. That's because Killark has been supplying the electrical needs of contractors for over 45 years. In 1942, Killark pioneered the use of aluminum and now manufactures exclusively the *only* complete line of aluminum fittings and fixtures. *They cost no more than malleable iron fittings.*

There are thousands of fittings in the constantly expanding Killark line. Many years of research, design and development are your assurance of the finest aluminum fittings at the lowest possible cost. Fast delivery is assured through convenient warehouse stocks in many cities.

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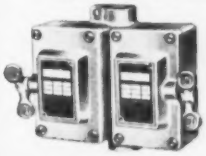
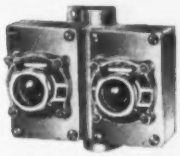


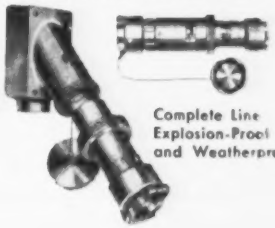
Switch



Pilot Light

Single and 2-Gang

PLUGS & RECEPTACLES



Complete Line
Explosion-Proof
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CLUSTER LIGHTS

150W to 500W.
Versatile in Design

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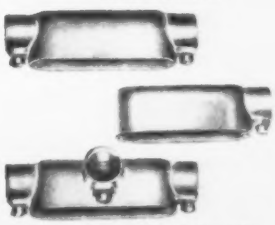
HONOLULU—Matt Cabot & Associates, P.O. Box 3708, Honolulu 11, Hawaii

SPEEDOLETS



For Thinwall Conduit
All Sizes thru 2"

news

Completion of the $3,500,000 fish passage facilities around Portland General Electric's North Fork Dam on the Clackamas River has given the structure the look of a piece of contemporary sculpture from the air. Lake entrance of the two-mile fish ladder and the start of the long ladder show along the right bank in photo, passing by the ski-jump-type spillway. The ladder leads into a five-mile pipe line into which downstream migrant fish are diverted to pass around PG-E's Cazadero and River Mill projects

Arizona Public Service Co. representatives worked with Dr. and Mrs. Robert Barfoot when they decided to establish their "short line" passenger service at Beaver Valley Resort. Mike and Steve Barnes get operating advice from Walter Surrett

These giant turbine blades weighing 12 tons each will be installed in the turbines at Priest Rapids Dam—six blades to each of the 10 turbines. The completed turbine wheel will be 23 ft 8 in. in diameter. Priest Rapids Dam is being built for Grant County PUD

Pacific Power & Light's 268,000-kw Swift hydroelectric project dominates the foreground of this photo, with Mt. St. Helens in the background. The 510-ft dam is the world's highest earth-fill dam, and impounds a reservoir 12 miles long.

When 21 employees of San Diego Gas & Electric Co. received citations for driving at least 25 years without an accident, H. E. Bennington, center, was high with 36 accident-free years. He is congratulated by E. D. Sherwin, president and C. E. Dunahoo, safety director.

Management

Wanapum Bids Low

Bids received May 15 by the Grant County PUD for construction of Wanapum Dam on the Columbia River were far below the engineers' estimates, easing the financing of the 831,250-kw project and indicating an early award.

The low bid, in the amount of $88,878,111, came from the Grant County Construction Co., a five-firm combination headed by Morrison-Knudsen Co. of Boise, Idaho. This figure not only is more than $48 million under the estimate of the Harza Engineering Co. of Chicago, Ill., but is more than $7 million under the next proposal, in the amount of $96,047,439, offered by Northwest Dam Constructors.

Bidding with Morrison-Knudsen were Henry J. Kaiser Co., Oakland, Calif.; Macco Corp., Paramount, Calif.; Raymond International Inc., New York; and F & S Construction Co., Butte, Mont. Northwest Dam Constructors is composed of Peter Kiewit Sons Co., Omaha, Neb.; Mid-Valley Utility Constructors Inc., Omaha; Al Johnson Construction Co., Minneapolis; Condon-Cunningham Co., Omaha; and Coker Construction Co. Inc., Omaha.

Merritt-Chapman & Scott Corp. of New York, now building Priest Rapids Dam for the PUD under a $91 million contract awarded in 1956, was third on the Wanapum contract at $97,073,300. A bid of $99,390,111 was offered by the combination of Perini Corp., Framingham, Mass.; J. A. Jones Construction Co., Charlotte, N. C.; Walsh Construction Co., San Francisco; and Manson-Osberg, Seattle. High bidders at $107,937,222 were L. E. Dixon Co., San Gabriel, Calif.; Arundel Corp., Baltimore; American Pipe & Construction Co., Portland, Ore.; Hunkin-Conkey Construction Co., Cleveland; and Guy F. Atkinson Co., South San Francisco.

The PUD had expected, on the basis of the $137 million estimated cost, that the project would require a revenue bond issue of considerably more than $200 million. It now hopes that the bond issue, for which it may receive an offer from its designated financiers by mid-June, can be held to $200 million.

A point of contention in awarding a construction contract may be the generators. The Grant County Construction Co. proposal includes an $11,261,500 subbid for generators, to be supplied by the A. S. E. A. Electric Co. of Sweden. Since the specifications require that each bidder quote a North American supplier on alternate figures where foreign materials are part of the bid, the contracting combine offered to supply General Electric generators for $15,650,157.

Some of the nine utilities that agreed to buy power to be produced by Wanapum Dam reportedly have insisted that equipment be supplied by domestic manufacturers. Representatives of foreign manufacturers, on the other hand, threatened court action if they were excluded from bidding and are likely to demand full consideration of the low bid.

The Grant County Construction Co. bid includes $10,187,000 for turbines, to be supplied by the Dominion Engineering Co. of Montreal, and $962,100 for turbine governors, to be supplied by the Baldwin-Lima-Hamilton Corp.

The PUD now will await an offer to purchase the revenue bond issue necessary to finance the project. It already has designated Dillon, Read & Co. and Kuhn, Loeb & Co., both of New York, as managers of the bond syndicate, with John Nuveen & Co., B. J. Van Ingen and Foster & Marshall as co-managers. The offer, provided that it is acceptable to the PUD, will determine the amount of the bond issue.

Amount of the bond issue, in turn, will determine the cost of power from the project. When these costs are determined, the nine utilities holding options to purchase 63.5% of the power are expected to sign formal contracts. Following sale of the bonds, the construction contract then will be awarded in time to permit start of work by Sept. 1.

Wanapum Dam will be located 18 miles upstream from Priest Rapids Dam, now approximately 75% complete. It will be a concrete and earth-fill structure in a modified Y shape. It will have a total over-all length of 8,320 ft, of which 2,920 ft will be reinforced concrete and 5,400 ft will be earth embankments. It will have a maximum height of 185 ft from deepest point of excavation and will have a head of approximately 80 ft.

The power house will be 1,540 ft long and will contain 10 generating units, with bays for six future units. The contract now under consideration includes all construction and all equipment with the exception of transformers, for which separate bids will be asked later.

Completion of the project is scheduled for the fall of 1964, said R. R. Ries, supervisor of production for the PUD.

Customer Report

Northwest Electric Light & Power Assn. has compiled customer data for the four Pacific Northwest states of Oregon, Washington, Idaho and Montana. As of Oct. 1, 1958, the population of the area totaled 5,896,000 with 2,009,025 electric customers.

Investor-owned utilities served 1,253,205 electric customers, or 62.5% of the total. Municipal systems in the Northwest served 18.7%, public utility districts served 12.4% and cooperative systems served 6.4%. In the area there are 20 investor-owned companies, 43 municipal electrical systems, 26 public utility districts and 74 cooperatives. In Oregon, Idaho and Montana, the investor-owned companies serve more than 80% of the customers; in Washington municipalities, co-ops and public utility districts serve just over 60%.

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Kw-1 Rodeo Coupon, Page 125.

Hanford Plutonium Producer May Generate Power

Work may begin this summer on a $145 million atomic reactor at Hanford Works which will produce plutonium and also may produce electricity, according to Wilfred E. Johnson, general manager of the General Electric Co. operation of the AEC installation.

The project has been authorized by Congress but final plans, including a decision on power production, have not been formulated.

Goal of the AEC is to produce atomic power commercially in areas of high power cost within 10 years and for the United States as a whole within 15 years, Johnson said.

"The present temper of Congress is such that atomic power plants will be built with government funds unless the utility industry can find some practical way of doing the job," the political scientists were told. "If such plants are built by the government, the federal government's area of influence in the utility industry obviously will be extended. There is, of course, the possibility that this could start a trend which would be difficult to reverse."

Economy Blossoms

McGraw-Hill's Department of Economics comes up with a very optimistic forecast for the remainder of 1959, 1960 and beyond. The projected healthy state of business for many months ahead is predicted on returns from the 12th annual Survey of Business' Plans. These indicate an increase in the physical volume of manufacturers' sales of 18% from 1959 to 1962 as well as a substantial advance in plans for capital spending during the years 1960 and '61. For the latter years capital spending in the order of $30 billion to $33 billion annually is predicted. Furthermore, the report indicates that practically all of this proposed expenditure can be generated through depreciation and retained earnings.

Also predicted is a relatively tight labor market in the forthcoming years as increased production and capital spending provide jobs that will reduce total unemployment to barely over 2,000,000 by 1962. Rapidly climbing total personal income, now at an annual rate of over $370 billion, will mean that there will be adequate consumer spending to support the economy at new prosperity levels.

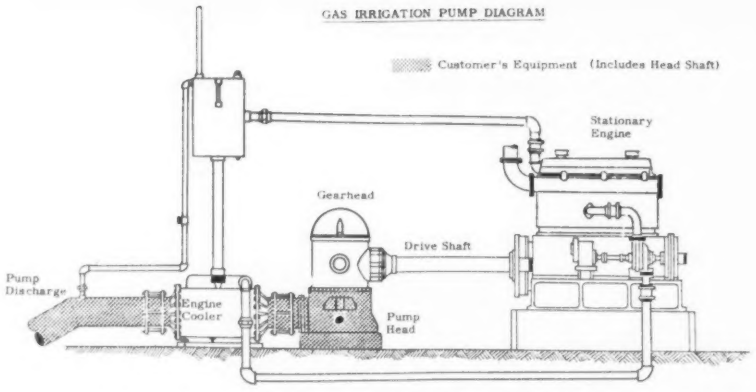


Diagram showing equipment the company will furnish and what the farmer must supply

Gas for Irrigation

Arizona Public Service Co. has announced a new approach to irrigation pumping – the sale of gas horsepower hours. The utility has filed a basic rate schedule with the state corporation commission, and says approval would permit farmers to make substantial savings in water pumping costs.

Public Service, which sells both gas and electricity, proposes to furnish farmers with natural gas engines, gearhead and all other accessories. The company would maintain, service and operate this equipment, selling energy actually delivered to the pump shaft. A metering device has been developed for measuring shaft mechanical energy.

According to Walter Lucking, president, the plan would result in average savings of nearly 11% in pumping power costs. Farmers could buy energy at an average price equivalent to 8.6 mills per kwh, less than the present average cost at the meter where electrically driven pumps are used.

The service would be offered initially in three agricultural areas of the company's Western and Wickenburg divisions—Harquahala Valley, Rainbow Valley and Aguila. The proposal might also open the way for rate competition with Salt River Project electricity if natural gas pump energy were made available to project irrigation farmers.

Financial Notes

Utah Power & Light Co. has deferred until the summer of 1960 equity financing it had scheduled for early this fall. Money requirements will be relatively low during the remainder of this year and will be handled by borrowings from the banks. The $14.9 million 1959 construction program will be used largely for transmission and distribution facilities, including 138-kv line from Moab to La Sal in southeastern Utah and a 69-kv line from Montpelier, Idaho, to Evanston and Kemmerer, Wyo.

Pacific Power & Light Co. also reported a gain of 7% in the past 12 months in industrial power output.

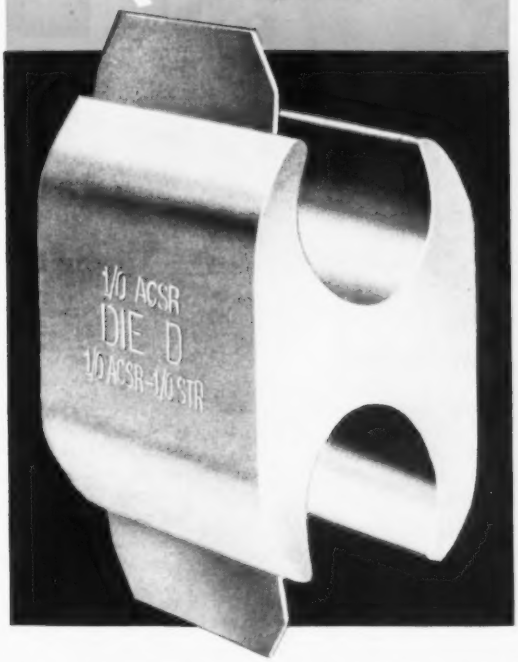
Tucson Gas, Electric Light & Power Co. revenues jumped from $10,819,000 for the 12-month period ending March 31, 1958, to $12,344,000 for the same period ending March 31, 1959. The net income to common stock was essentially the same for the two years, however, at $2,432,381.

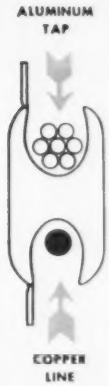
Idaho Power Co. registered an 11% increase in operating revenues for the 12 months ending March 31, 1959, over the like period of 1958. The balance available for common stock dividends and surplus, however, increased 15.9% to $6,972,404.

Southern Nevada Power Co. showed a substantial increase in total revenues for the 12 months ending March 31, 1959, and carried a considerable portion of the increase through to earnings which rose from $1.41 per share of common a year ago to $1.75 per share for the 12 months ending March 31. Part of the improvement was the result of a rate increase made effective April 1, 1958.

The earnings of the Southern California Edison Co. for 1959, according to Board Chairman Harold Quinton, are expected to be slightly greater than the $3.70 per share recorded last year. First quarter net earnings this year amounted to 95¢ per share. Gross revenue was up 9% and kilowatt-hour sales were up 13% for the first three months of 1959.

new! KEARNEY DOUBLE-TAB SQUEEZON





Exclusive Kearney design permits either groove to be used for line or tap. Diagram illustrates Double Tab Squeezon used to make an aluminum "step-up" tap to copper line connection.

NOW! The Easiest Way to Make Both "Step-Up" and "Step-Down" Tap Connections on All Combinations of Copper, Aluminum and ACSR

The newest, most versatile Squeezon Compression Connector. Dual, fully open groove design, exclusive with Kearney, eliminates need to thread tap conductor through fitting. Use *either* groove for line or tap . . . make "step-up" or "step-down" tap connections quickly and easily. Double Tab Squeezons speed up deadending, too. Form the loop . . . drop the conductors into the open grooves . . . and compress! On insulated wire, remove only a "Squeezon-length" of insulation!

Available in a range of size combinations for aluminum, copper or ACSR. (Write for Selector Card.) Individually packaged in handy "Snap-Open" boxes; grooves factory-filled with Kearnalex inhibitor and contact aid.

REVERSIBLE
The only compression connector with built-in spacer that makes *BOTH* "step-up" and "step-down" tap connections, from copper to ACSR, aluminum to ACSR, or aluminum to copper.

MASSIVE SPACER
Separates conductors . . . eliminates strand cutting . . . and aids in the prevention of galvanic corrosion between dissimilar conductors.

SECONDARY DEADENDING
Faster, easier. No threading through . . . form the loop, position Squeezon and compress! On insulated wire, strip only enough insulation to make the connection.

"SNAP-OPEN" BOX
Individually packaged. Box snaps apart along perforated line . . . INSTANTLY, CLEANLY . . . even with gloves! No stripping, no peeling.

NO DISTORTION
Squeezon groove jaws completely encircle conductor when compressed . . . provide dependable long-line, full circumference contact without distortion or damage to conductor.

for better construction . . . safer maintenance . . . specify KEARNEY products

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

JAMES R. KEARNEY CORPORATION

4224-42 Clayton Avenue, St. Louis 10, Missouri

PLANTS AT: ST. LOUIS • FAYETTEVILLE, ARKANSAS • SHENANDOAH & CLARINDA, IOWA • GUELPH, ONTARIO, CANADA

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, Inc.,**
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For phone number of closest representative see advertising index in back of book.

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Market Development

Arthur Ellis, San Diego Gas & Electric Co., and Walter F. Chapman, the utility's commercial manager, look through the Medallion Home. At right Ellis shows features to Maggie Wall, San Diego Bureau, an enthusiastic member of the fair staff

San Diego Fair Visited By 145,000

A Parade of Kitchens, a Medallion Home and a garden lighting display told the all-electric story to some 145,000 attending the San Diego Bureau of Home Appliances' 1959 Spring Fair of Modern Ideas, April 24-29.

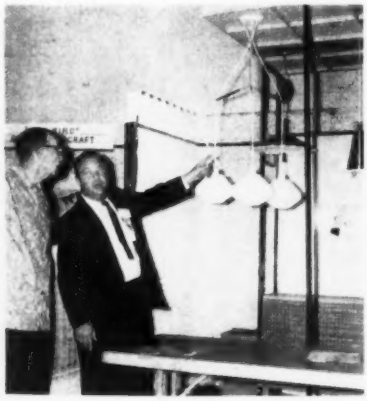
Color TV demonstrations, displays of major and portable appliances and a model train exhibit were other attention getters at the afternoon and evening shows in the Electric Building at Balboa Park.

Instituted last year by the bureau's Kitchen Division, the parade included seven modern kitchens, completely equipped and ready to install. Set up by manufacturers and kitchen specialists with special attention to workmanship and detail, these kitchens held many hints for homemakers who want to modernize as well as those planning new homes.

For contrast and as a special attraction an eighth kitchen was sponsored by San Diego Gas & Electric Co. and Knott's Berry Farm—Grandmother's Kitchen, featuring equipment of the gay nineties.

The Medallion Home, a feature of the Contractors Division's display, was built by Mesa Realty Co. and was a replica of those in its Lakeview Estates. Although this exhibit

Jim Hardin, San Diego G&E, and Robert F. Gray, St. Charles Kitchen Designers, discuss the Parade. Gray is chairman of the bureau's Kitchen Division



Jerry D. Long, lighting specialist for Thomas Industries Inc., shows one of the fixtures made in the company's West Coast plant at Los Angeles

was manned by builder and utility people ready to act as guides, all equipment was labeled for the convenience of those who wanted to look through the house "on their own."

Also sponsored by the Contractors Division was the garden lighting display put in by William Shalda, supervisor of lighting for the U. S. Pavilion at the Brussels World Fair. Shalda Mfg. Co.'s new floating color fountain had its initial showing.

New this year was the use of the fair displays for a Home Economics Workshop, sponsored by the Electrical Women's Round Table, San Diego Chapter. More than 100 home economics teachers from city and county schools attended a three-hour session just before the doors opened to the public on Saturday. Demonstrations were put on by exhibitors in their individual booths, then the group lunched together as guests of the bureau and manufacturers.

The salesmen's incentive plan started last show was used again to insure that booths were manned at all times. Under this plan salesmen received more than 100 cash prizes in drawings held twice daily.

Managed by J. Clark Chamberlain, bureau secretary-manager, with the assistance of Alan McCutcheon, Contractors Division, Jim Hardin, Parade of Kitchens, and "Boots" Bouton, this was a "selling" show. As one exhibitor put it, there were "no gimmicks – just merchandise as it is."

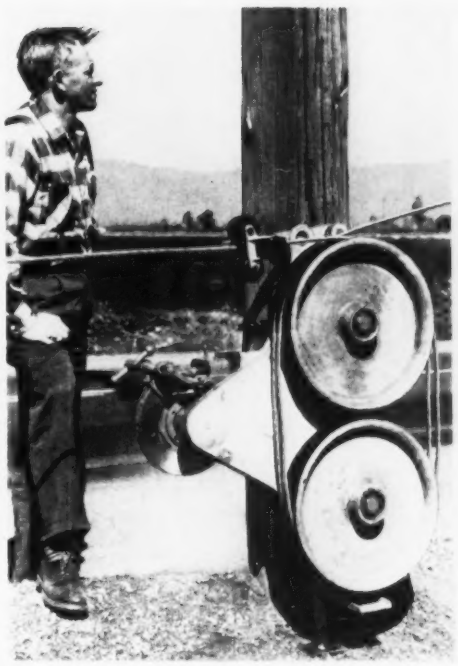
Electric Garden

Panoramic views of scenic attractions and industries in Pacific Power & Light Co.'s Oregon service area will be among features of an "Electric Garden" theme for the utility's Powerland exhibit at the Oregon Centennial Exposition.

A star performer of the PP&L exhibit will be Dr. K. W. Electro. This electronic computer will not stop with answering questions. It will also compose music from notes selected at random by visitors and will compete with them in games of tic-tac-toe.

A closed-circuit television system will permit exposition visitors to view themselves on a TV screen.

► **Electric heat sales** for the first three months of 1959 were running well ahead of last year, the **Inland Empire Electrical League** reports. March sales of 91 installations brought the total to 321 for the first quarter, an increase of 26% over the same period last year.



New from PENGO

...a tensioner you can carry in every line truck!

The most mobile of all PENGO tensioners, the 4000 PM can be hauled on any line truck or pickup. It features two 18-inch diameter Neoprene-lined magnesium bullwheels for stringing any size conductor up through .625-inch diameter. This includes any 4/0 A.A., ACSR or copper, and up to 266,800 CM Waxwing ACSR. With its 11"-inch Tru-stop disc brake, the 4000 PM will pay out smoothly under continuous working tensions up to 800 lbs.

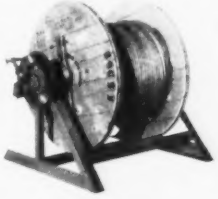
Any type power now employed may be used for pulling, such as collapsible reel attached to a winch shaft.

The tensioner includes a stiff leg and base plate for leaning against the pole. One man holds up the unit while another places a chain around the pole with a bolt and large wing nut tightener to hold it in place. The unit will not slide around the pole even under maximum tension. Conductor can be payed off any reel stand (such as the PENGO 4100 shown) or other device with sufficient drag to prevent overrun of the cable between the reel and the bullwheel input groove.

Input fairlead swings to either side, permitting stringing in either direction. This gives complete flexibility in alleys and other areas with obstructions such as walls and fences on one side of the pole. Extreme care has been taken to make the PENGO 4000 PM Pole Mount Tensioner useful under every conceivable condition.

4000 PM Specifications

Overall Length	31½"
Overall Width	15"
Overall Height	40½"
Approx. Weight	165 lbs.
Bullwheel OD	18"
Bullwheel Groove	⅝" dia.
Working Tensions	to 800 lbs.



PENGO Model 4100 Reel Stand

Handles reels to 48" in diameter by 34" wide. Equipped with same spindle brake assembly used on all PENGO Reel Stands; includes PENGO lifting yokes for easy reel changing. Ideal for paying out conductor to the 4000 PM tensioner.

TENSION WIRE STRINGING is far safer, saves you plenty of time and money. Why not get the facts today? Write for new PENGO Catalog TWS-1 for full information on the world's most complete line of tension wire stringing equipment; address Dept F-6

8-9

PETERSEN ENGINEERING CO., INC.
Santa Clara, California
Phone AXminister 6-7712

Belgian visitors saw what trained home economists contribute to utility load building when they visited the PG and E home economics department. In the test kitchen they saw latest major appliances, including an electronic range, and some 25 portable electric devices. Afterward they went to the home of Marguerite Fenner, home economics director, where these pictures were taken. This medium-size, one-bedroom apartment uses an average of 300 kwh per month, and the group made a careful inspection of the lighting and the electric kitchen there. Mrs. Fenner is shown left with Georges DeVigne, interpreter, and Jacques Snoeck; at right with Jean Collet and Jean Roffiaen

Belgian Study Group Visits the West

Twelve private utility executives from Belgium visited three Western power companies last month to study load-building methods. Pacific Gas and Electric Co., Arizona Public Service Co. and Public Service Co. of Colorado were among U. S. utilities selected for study in the 1959 tour of the Association of Belgian Private Electricity Supply Companies.

The group spent two days in San Francisco with key people on PG and E's residential, commercial and industrial sales promotion staff. It was explained that the present average residential consumption of the several small UEEB companies represented was in the neighborhood of 400 kwh annually. They asked that, if possible, PG and E go back in its records to the time its consumption was at that level. But even in 1920, for which the earliest complete figure is available, PG and E's average annual consumption was 510 kwh.

One visitor pointed out, however, that the group was studying both large and small operations in its search for ideas and materials to help build load. This same man expressed the opinion that it was load building, not engineering, knowledge that was required.

Leader of the tour was Camille Blanchart, member of the board of UEEB and chairman of its public relations committee. He and two others on the 1959 tour were with the 1955 study group visiting the United States.

► **Rex N. Anderson** has been appointed Intermountain area sales manager for Westinghouse Electric Corp. Formerly mineral industries manager for the Pacific Coast, he will continue as consultant in that field. From headquarters at 235 West South Temple St., Salt Lake City, he will be responsible for the territory including Utah and parts Nevada.

Give Electrically

Northern California Electrical Bureau's Electrical Housewares Section used the "Give Better Electrically" theme in its May promotion for Mother's Day, weddings and anniversaries. The program was featured by several hundred hard-hitting radio spot announcements on five stations.

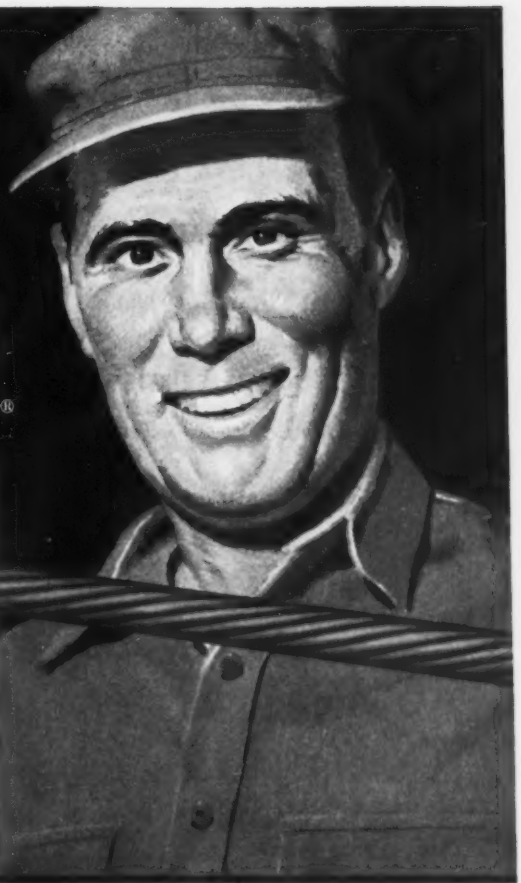
Pacific Gas and Electric Co. supported the promotion by supplying some 1,509,000 bill inserts on electrical housewares mailed throughout northern and central California during May, and TV commercials on seven stations during May and June.

LeRoy Herbert, Oster Mfg. Co., San Francisco, is chairman of the bureau's Housewares Section. His committee includes: H. A. Bentzen, Dormeyer Corp.; Lloyd Groeschel, Groeschel Sales Co.; Jack Roberts, Hamilton Beach Mfg. Co.; R. M. Pollard, General Electric Co.; Karl Lepple, Landers, Frary & Clark; Paul R. Seaman, National Presto Industries; J. Simmers, D. E. Sanford Co.; John Sandoval, Sunbeam Mfg. Co.; William Hoban, Toastmaster Products Division; Frank Craddock, Westinghouse Electric Co.; Don B. Wagener and Don F. Swanson, Dominion Electric Corp.; and William Herbert, Shetland Co. Inc., all of San Francisco.

Gold Medallion pen set being awarded to Idaho Power's eastern division for sales achievement is made from a Gold Medallion, a hardwood polished base drilled and tapped for a pen holder ferrule. Some 60 were given to architects and engineers in the area to remind them to specify Gold Medallion. The pen set is also used to reward salesmen for achievement. In the picture are C. J. Lammers, residential and farm man, Pocatello; Al S. Gilbert, general sales manager, making the award; Larry W. Brainard, eastern division manager; J. E. Crawford, residential and farm man in Salmon; and Tom A. Spofford, commercial and industrial salesman in Pocatello, the top division last year

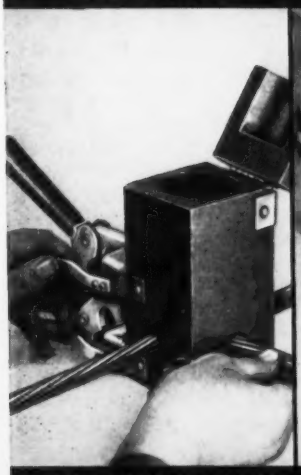
Now you can weld a perfect, permanent electrical connection every time with

BURNDY thermOweld®



. . . connects easily and economically to any copper conductor or steel structure

Get a permanent THERMOWELD connection quickly...never corrodes or loosens, costs little to install. Current-carrying capacity higher than conductors.

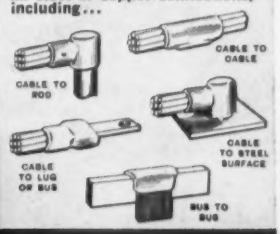


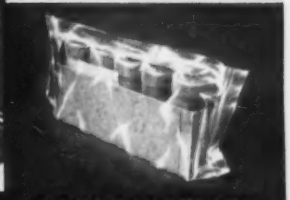
Weld anywhere, to cable or flat, with this compact, lightweight THERMOMOLD. Completely self-contained... needs no external source of power, no special skill.

Pour welding powder into mold, tap to release starting charge. Unique composition of starting charge prevents mixing with welding powder, assures positive firing. Slag easily removed.

Close cover and ignite charge with flint gun. Fast-burning powder fires every time. THERMOWELD reaction forms liquid copper which fuses conductors into a solid copper mass.

You can THERMOWELD almost all steel or copper connections, including...





THERMOWELD fires every time. Cartridges sealed in polyethylene envelopes with moisture absorbing silica gel. Starting, welding charges can't mix...full starting charge assures ignition.

All components are available from your local Burndy distributor. Ask him or your Burndy representative for a demonstration.

BURNDY

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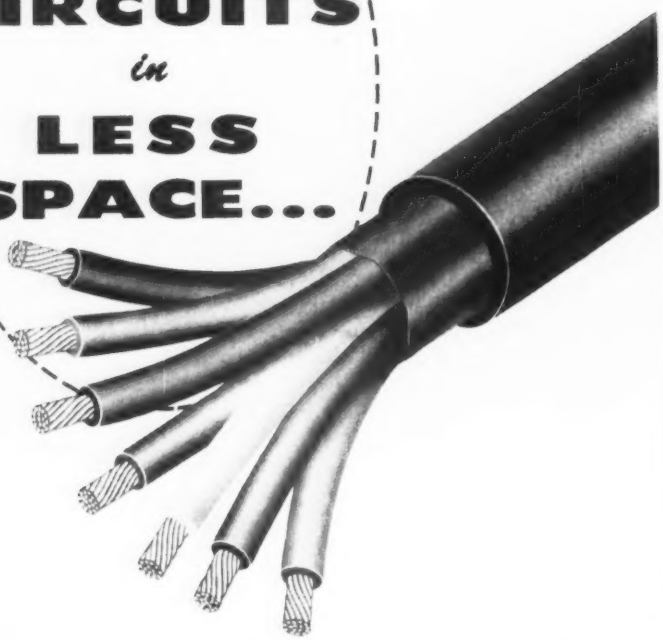
Norwalk, Connect. In Europe: Antwerp, Belgium Toronto, Canada

FOR MORE CIRCUITS *in* LESS SPACE...



Use SUPERIOR SD Control Cable

Superior's SD Control Cable provides for the maximum number of control circuits in the least amount of space!

Overall diameters are reduced by as much as 20% to 35% without any sacrifice of quality or reliability. Armored with tough nylon, the flexible, stranded, polyethylene-insulated conductors are color-coded to your requirements. Non-hygroscopic tape covers the conductor core. The smooth, neat, outer jacket of polyvinylchloride has excellent resistance to oils, acids, alkalis and solvents and eliminates the need for conduits.

For *more* circuits in *less* space, use SUPERIOR SD Control Cable . . . highly efficient, economical, too!

For complete information and prices, write

SUPERIOR CABLES

SUPERIOR CABLE CORPORATION

Hickory, North Carolina 4028

For phone number of closest representative see advertising index in back of book.

Manufacturers—Distributors

Alcoa Ups Production

Aluminum Co. of America has reactivated one of two idle potlines at its Vancouver Works. According to D. H. Tilson, Alcoa's Northwest operations manager, steadily improving demand is responsible for the decision to increase production at Vancouver from 60% to 80% of installed capacity.

Two of five potlines had been idle since February 1958, and a part of the capacity had been inoperative since the fall of 1957, when critical water conditions cut off interruptible power supplies.

Reactivation of the Vancouver potline is part of a 40,000 ton-per-year production increase announced by Alcoa.

► **Acme Electric** Corp. has moved its West Coast headquarters to a new plant at 12822 Yukon Ave., Hawthorne, Calif. **Ray McWaters** and **Ken Burton** head up engineering and sales, respectively.

► **Crittenden Transformer Works** has moved to 13011 S. Spring St., Los Angeles.

► **Leonard Hobbs** and **Bill Jones** of Smoot-Holman, Los Angeles, were in Cleveland May 5-6 to attend meetings of the RLM Standards Institute. Hobbs, vice-president of Smoot-Holman, is a member of the board of trustees of the institute. Jones, a research engineer, is on the technical committee.

► **Arrow-Hart & Hegeman** Electric Co. has been given nonexclusive right to make and market switches under the Touchette patent owned by **Rodale Mfg. Co.** With the agreement Rodale withdrew a lawsuit against Arrow for patent infringement.

► **Calavar** Corp. has completed a new building in the Los Angeles area to house engineering, manufacturing and expanded service facilities. Located on the Santa Ana Freeway in Santa Fe Springs, the structure is part of an expansion program. Parts department and general offices will remain at 2700 S. Broadway, Los Angeles. The company handles FWD trucks and other heavy-duty equipment.

► **Sangamo Electric** Co. and the **Fischer & Porter** Co. have signed an agreement under which the former will handle all sales of FP digital demand recorders and translating systems to the electric utility industry. Two models of translators will be made available: a simplified model for translating and identifying tape data and a larger model that incorporates all features.

► Chartering of the **Charles Motor** Corp. of San Diego to handle sales of the Charles Townabout electric automobile has been announced by Dr. Charles H. Graves, president. The electric auto is made by Stinson Aircraft Tool & Engineering Corp. of San Diego. Charles headquarters are at 7961 Clairmont Mesa Blvd.

► **Arvin Industries,** maker of portable electric heaters, will enter the home heating field about July 1, according to President Glenn W. Thompson. The company will offer builders and electrical contractors a full line of radiant, fan-forced and baseboard heating systems, he said. **Leo W. Burns** will be director of sales for the new division.

► **Janette Electric** Mfg. Co. has appointed **Bearing Sales & Service** Inc. as distributor for its line of gearmotors and speed reducers. Bearing Sales & Service has nine outlets in western Oregon and Washington.

► A new name and a new address have been announced by **C. J. Holzmueller,** Lighting. The firm, now Holzmueller Corp., has moved to 360 Sixth St., San Francisco. Warehouse address is 155 Harriet St. The same management and personnel will handle the business, which offers theatrical lighting, including manufacturing, engineering, sales and rentals.

► **RT&E Corp.** has appointed **David B. Cole** sales representative in the Los Angeles area, with headquarters at 1215 Flintridge Ave., Pasadena.

► **Utility Transformer & Equipment** Co., Baraboo, Wis., has appointed **Ray L. Martin & Son** of Portland as its representative in Washington, Oregon, northern California and Idaho and northwest Montana.

► **Corwin-Hall Distributing** Co., Los Angeles, is now handling **Chrysler Airtemp** room conditioners. Headquarters are 1060 S. Figueroa.

The **BEST** *in the* **WEST**

These attractive units are Circle A-W's newest meter and breaker combinations for apartment houses.

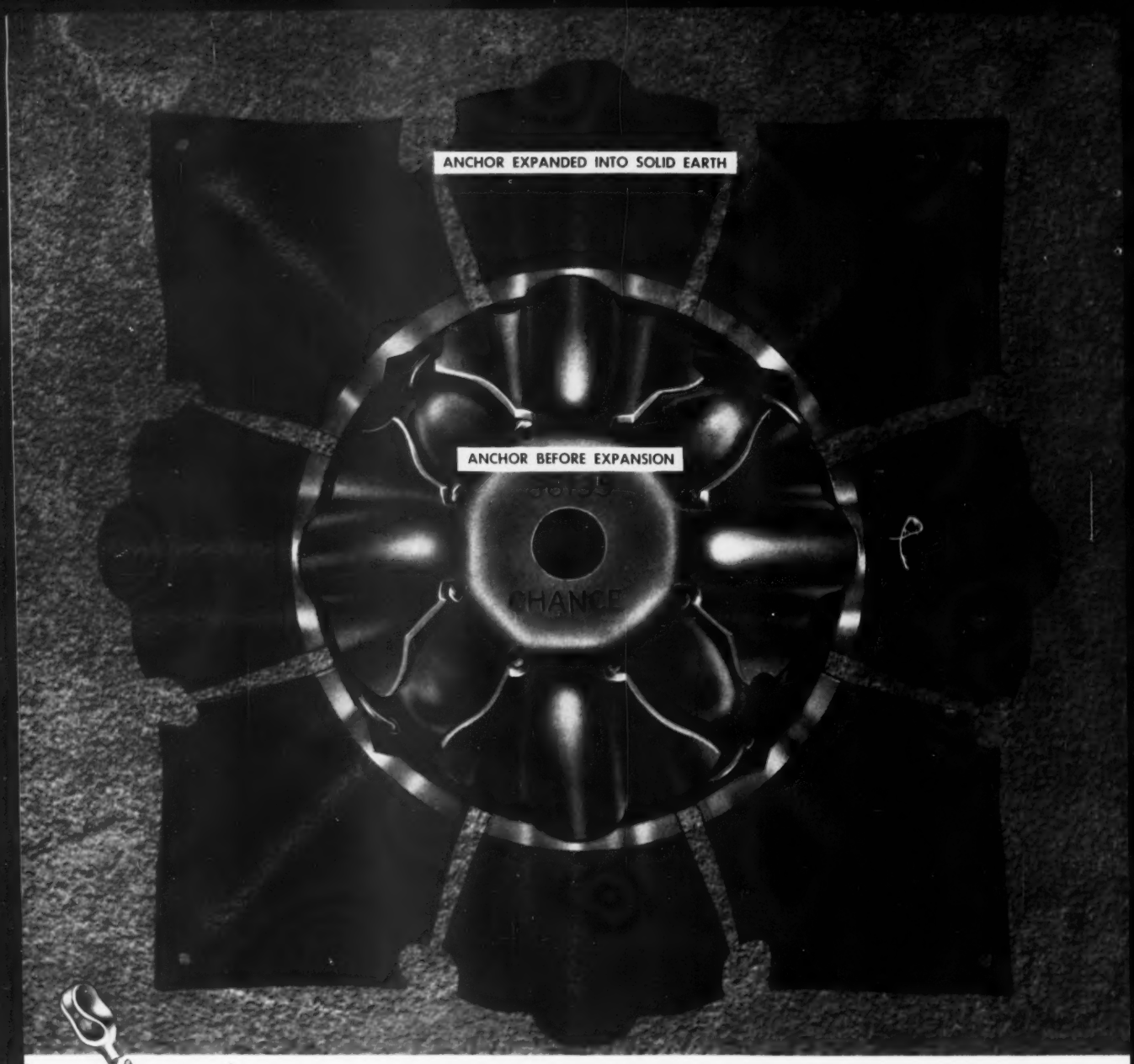
Listed with Underwriter's Laboratories, Inc.

100 Amp outdoor service equipment—pre-wired for economical installation and designed for arrangement in combinations to meet your specifications.

See Catalog No. 8 for combinations and prices

CIRCLE A-W PRODUCTS COMPANY
P. O. Box 1171 • Modesto, Calif.

For phone number of closest representative see advertising index in back of book.



You get over 60% expansion into solid earth with this CHANCE 8-Way Expanding Anchor

It's a fact! Sixty three per cent of the Chance 88135 Anchor, shown above in reduced size, expands into solid, undisturbed earth. All Chance 8-Ways give similar expansion—develop all-around holding power. The eight rib-reinforced blades expand to form a square, with no wasted space between blades. Holding power is distributed over a wide area.

Chance 8-Ways are now packed in extra high-strength, color-coded cartons for better storage and handling.

Build lines to STAY with the CHANCE 8-WAY

A. B. CHANCE COMPANY

CENTRALIA, MISSOURI A. B. Chance Co. of Canada, Ltd., Toronto

CA59-5

Announcing

The Third Annual Kilowatt-hour Contest

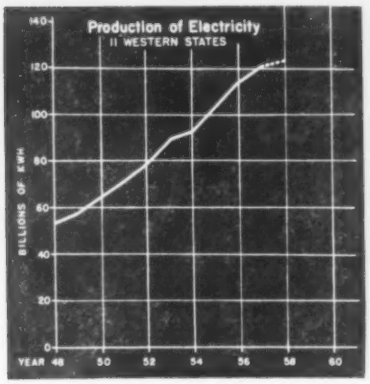
Electrical West's Kwh Load Forecasting Rodeo

A Chance To Put Your Brand on a $500 Block of Stock of a Western Utility

The Object— To forecast the total kilowatt-hour output of the power stations in the 11 Western states for the year 1959, giving reasons for the estimate in 25 words or less. Federal Power Commission figures of kilowatt-hour output will be the final authority.

The Contestants— Any person employed in any segment of the electrical industry in the 12 Western states or Hawaii may submit one entry in the contest—using the attached postcard or a reasonable facsimile thereof. Entries must be postmarked not later than June 30, 1959. Employees of the McGraw-Hill company and its subsidiaries are ineligible to participate.

The Prize— ELECTRICAL WEST will award the winner, who comes closest to the actual official FPC kwh output figure, $500 worth of common stock in one of the electric companies serving an area of the 12 Western states. The electric utility whose common stock will be the prize will be determined by a drawing held at the annual Pacific Coast Electrical Assn. convention in San Francisco, May 20-22, 1959. Stock representing the prize will be purchased immediately after the drawing and held in escrow with any accrued dividends until the winner has been determined. In case of ties, the prize will be divided equally between those submitting the winning figure.



A Hint— In 1958 the official kilowatt-hour output figure for the 11 Western states was 122,819,372,000 kwh as reported by FPC.

It's Fun—It's a game of skill—and a test of your optimism about Western growth. Calculate what this figure will be for 1959! It costs nothing to enter the contest. Just send in your estimate on the attached card, by letter or other postcard.

To ELECTRICAL WEST's Kilowatt-hour Contest Editor

Here's My Forecast

The annual kilowatt-hour output for the 11 Western states for the year 1959 will be ..... kwh.
Here's why (in 25 words or less).

.....

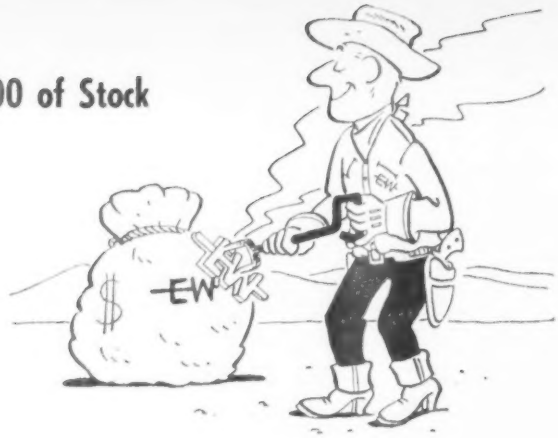
.....

.....

Name .....
Title or job .....
Company .....
Address .....
City ..... State .....

(Return before June 30, 1959)

Put *Your* Brand on $500 of Stock



Use this Card to Enter

ELECTRICAL WEST'S

—Kilowatt-Hour Rodeo—

See preceding page for details

Postage Will Be Paid by Addressee

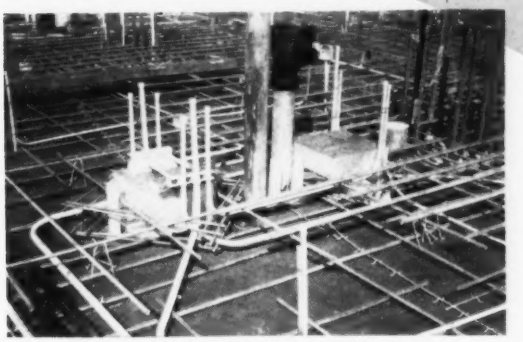
No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL
First Class Permit No. 1803, San Francisco, Calif.

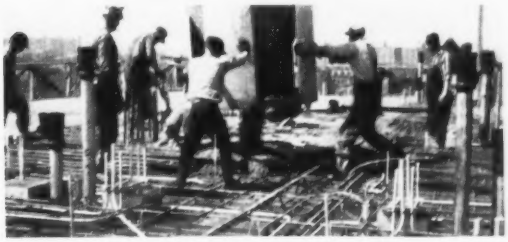
Electrical West's Kilowatt-hour Rodeo
68 Post Street
San Francisco 4
California

In Prairie Shores Apartments, Chicago... THE BEST COSTS LESS INSTALLED

Building: Prairie Shores Apartments, Chicago, Illinois
Architect: Loebel, Schlossman & Bennett, Chicago, Illinois
General Contractor: Sumner Sollitt Company
Electrical Contractor: Sievert Electric Company



Compact stub groupings, good alignment, are marks of craftsmanship. Perfectly round ELECTRUNITE stays round, even when knocked over and carefully straightened, is the report on the job. Another reason why . . . *the best costs less installed.*



Uniform concentricity of ELECTRUNITE assures snug fit of couplings and connectors—shutting out moisture and concrete. No threads to cut, no runs to turn. Proof can be found in the millions of feet of ELECTRUNITE that has been installed in concrete. Installations made more than 25 years ago are still in service.

80,000 feet of Republic ELECTRUNITE® E.M.T. was used in the construction of Prairie Shores Apartments, Building #2, Chicago, Illinois. And more has been ordered for the third building of this group. Because . . . *The Best Costs Less Installed!*

In bending, pouring, wire-pulling, pushing, ELECTRUNITE E.M.T. meets every on-the-job installation test. ELECTRUNITE is lightweight, easy to handle. Yet, provides all the corrosion-resistance protection, strength, and advantages of steel.

ELECTRUNITE E.M.T. is "INCH-MARKED"® in feet and inches for easy, accurate measuring. Full length "GUIDELINE"® keeps bends in the correct plane, avoids costly "wows". Exclusive "INSIDE-KNURLING" with new SILVERSLICK Finish makes wire pulling up to 37½ easier, wire pushing easier, too.

ELECTRUNITE E.M.T. is produced to meet all electrical codes, specifications, and carries the UL Seal of Inspection. To learn more about Republic ELECTRUNITE E.M.T., call your local electrical distributor, or write. Send coupon.

REPUBLIC STEEL
STEEL AND TUBES DIVISION

REPUBLIC STEEL

Cleveland 8, Ohio

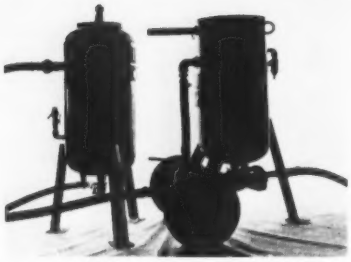
REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
DEPT. C-7673-A
216 EAST 131st STREET • CLEVELAND 8, OHIO

I would like to learn more about the installation advantages and economies of Republic ELECTRUNITE E.M.T. Please send information.

Name_____ Title_____
Firm_____
Address_____
City_____ Zone____ State_____

For phone number of closest representative see advertising index in back of book.

U-AUTO CLEAN'ER



Cleans 'em HOT
Cleans 'em DRY

U-AUTO DRESS'ER

Dresses 'em HOT with a *thin* layer of dispersed silicone gel.

—or—

A *thick* layer of MELTED silicone grease.

Auto Hot-Stick Rentals Inc.
438 W. Laurel St.
Compton 3, Calif.

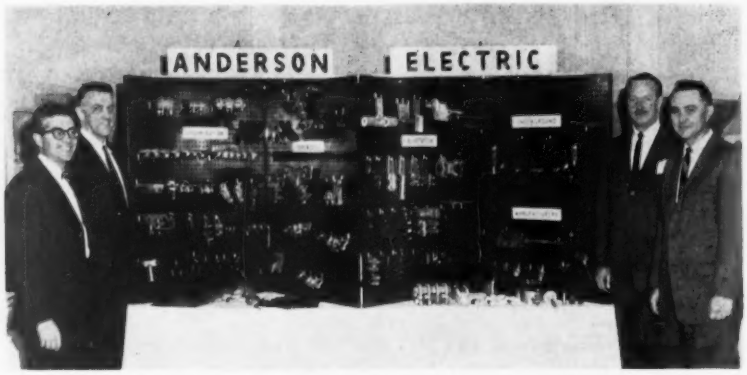
Please send further information

Name

Name of firm

Address

City Zone State



Anderson Electric Corp. has completed a 6,500-mile tour of the eleven Western states with this product display, visiting 30 utilities and showing its wares to 416 guests, generally at luncheon meetings. The tour included one convention, NELPA's E&O meeting at Salt Lake City. Shown at Los Angeles are Hubert James Jr., Western regional sales manager, who conducted the tour; R. L. Lock, vice-president in charge of engineering for Anderson, and A. W. Jensen and Jerry Andrews of Industrial Engineering & Equipment Corp., the company's sales representatives in southern California and Arizona

► **Calrepco,** Los Angeles electrical equipment dealer, will represent **Anderson Electric** Corp. in southern California, Arizona and parts of Nevada, handling sales to aircraft, nuclear and missile industries only. Connector sales will continue to be handled by **Industrial Engineering & Equipment** Corp. of Los Angeles. Calrepco, a firm organized in 1956 and owned by Michael Rohrich and Kimon Koudouriotis, is located at 1417 Georgia St., Los Angeles.

► **Multi-Amp** Corp., Union, N. J., has appointed **Line Material Industries** as a national distributor, handling the ACTS series test instruments for oil circuit reclosers.

► **Smithcraft Corp.** is the new name of Smithcraft Lighting, Chelsea, Mass. Concentrating its facilities in the lighting field, the company is discontinuing its heavy metal fabrication division, an outgrowth of the original A. L. Smith Iron Co. and giving up that corporate name.

► **Franklin Engineering** Co., 406 S. Main St., Los Angeles, is now sales representative for **Copes-Vulcan** Division, Blaw-Knox Co., handling equipment for steam plants. Its territory includes Arizona, Clark County, Nev., and southern California.

► Purchase of the **A-C Motor Division,** O. A. Sutton Co., has been announced by P. H. Neville, president of **Leece-Neville** Co., Cleveland. He said that, with this first move into the a-c motor field, Leece-Neville will make a line of single-phase, fractional horsepower motors of two types, shaded pole and permanent split capacitor.

► Executive appointments: **M. B. Mallett** has joined **Moloney Electric** Co. as vice-president in charge of commercial application. He formerly was manager of English Electric Co. at St. Catherines, Ontario, Canada . . . **Sangamo Electric Co.** has appointed **Hugh W. Griffith Jr.** to the new position of sales manager, power equipment, to direct activities of the outside sales organization . . . **Federal Pacific Electric** Co. has made three appointments in its marketing department: **Charles A. Schmidt** and **Felix C. Karlson** were promoted to newly created posts of industrial marketing manager and merchandising sales manager, respectively; **Charles G. Sobel** has joined the company as export marketing manager . . . **William Hallam** has been transferred from St. Paul to Pittsburgh headquarters as sales manager of **National Electric Division, H. K. Porter** Co. . . . **Clifford J. Ortmeyer** has been made sales manager for utility products for the **Penn-Union Electric** Co. . . . **Kuhlman Electric** Co. has announced appointments to two new sales positions: **Robert J. Farr,** manager of sales services; **M. M. Lindamood,** product manager.

► The **A. B. Chance** Co. has purchased the **Starline** Co., Dayton, Ohio, a plastic manufacturer. It will be operated as a wholly owned subsidiary with product sales to be handled by the marketing division of the parent company.

Associations

► **Frank Search,** Frank's Electric Motor Service, Long Beach, was elected president of the National Industrial Service Assn.'s chapter in the Los Angeles area on March 10. **Bud Cochrane** of Alexander-Williams Co., Santa Ana, was elected vice-president; **Clare Smallcomb,** Smallcomb Electric Co., Los Angeles, secretary-treasurer.

Meetings Calendar — 1959

JUNE

4- 6—*NELPA*, Accounting and Business Practice Section, Finlen Hotel, Butte.

21-26—*American Institute of Electrical Engineers*, Pacific general meeting, Hotel Olympic, Seattle.

22-24—*National Electrical Contractors Assn.*, joint conference of Districts 6, 8 and 9, Glacier Lodge, Glacier National Park.

22-26—*Western Summer Market*, Western Merchandise Mart, San Francisco.

28-July 3—*Los Angeles Market*, Los Angeles Furniture Mart.

JULY

6-9—*Pacific Coast Builders* Conference, San Francisco, Sheraton-Palace Hotel.

AUGUST

11-14—*International Association of Electrical Leagues*, annual conference, Hotel El Cortez, San Diego.

18-21—*Western Electronic Show and IRE Convention*, Cow Palace, San Francisco.

24-26—*International Association of Electrical Inspectors*, Northwestern Section annual meeting, Seattle.

31-Sept. 3—*IAEI*, Southwestern Section annual meeting, Hotel Flamingo, Santa Rosa, Calif.

SEPTEMBER

7-11—*Illuminating Engineering Society*, National Technical Conference, Mark Hopkins and Fairmont Hotels, San Francisco.

16-18—*IIEE—ASME*, Engineering Management Conference, Los Angeles.

16-18—*NWPPA*, Power Use Workshop, Ephrata, Wash.

20-21—*National Association of Electrical Distributors*, Western zone convention, Hotel El Miramas, Santa Barbara.

25—*Intermountain Electrical Assn.*, Fall Dealer Conference, Newhouse Hotel, Salt Lake City.

28-30—*NELPA*, annual convention, Hotel Vancouver, Vancouver, B.C.

OCTOBER

25-29—*RMEL*, annual convention, Broadmoor Hotel, Colorado Springs.

. . . by more contractors than any other portable cord

The cord that clicks with contractors is ROYAL . . . and the reasons are many. Made to high standards of quality, and controlled every step of the way under one roof, Royal cords offer the quality characteristics that you look for most in your work — flexibility, durability and dependability.

Royal offers the most complete range of types and sizes, too, through your electrical wholesaler; one recognized and respected name on all your flexible cord — Rubber, Neoprene and Plastic Jacketed Portable Cords, Thermostat Cable, Lamp and Fixture Wires, Machine Tool Wires, and heavy duty "POWR-KORD" extensions.

Next time you order cords, specify ROYAL.

Royal Electric Corporation
Pawtucket, Rhode Island

ROYAL ELECTRIC ...an associate of LCP

SALES REPRESENTATIVES AND WAREHOUSES: Los Angeles 1950 Naomi Avenue, RI 7-9655, **San Francisco** 1225 Sixth St., HE 1-5792, **Seattle** 4130 First Ave., So., MA 3-8882, **Denver** 888 S. Lipan Street, WE 6-3456

Installation banquet tendered officers of San Francisco Electrical Contractors Assn. (above) April 18. President Emil J. Weber, officers, directors and their wives at head table. At left, San Mateo Chapter, NECA, honored its oldest member, Seth Cohn, a contractor for more than 50 years. President Everett Marshall paid tribute to Cohn's long association service

New Officers Honored

To honor their newly elected officers the two associations, that until this year were one, held their two dinner dances a week apart in San Mateo and San Francisco, April 11 and 18, respectively. The new San Mateo Chapter, NECA, held its installation dinner at the Villa with a crowd of nearly 300. San Francisco Electrical Contractors Assn. held its dinner in the chartered night club, The Village, and had an attendance of almost 600 from all parts of the Bay area.

At San Mateo President Everett Marshall, re-elected again, paid especial tribute to Seth Cohn, who, after 50 years as proprietor of Atlas Electric Co. in San Mateo, announced his retirement. A $20 gold piece, minted in the year that Seth Cohn started business, was made into a medal and presented to him. Mrs. Cohn, his helpmate and active in the business with him, was likewise honored.

Officers of the San Francisco association who were honored were President Emil J. Weber, re-elected again after several terms; Fred E. Wider, vice-president; L. Roy Moser, treasurer; Matt J. Buzzell, secretary; Warren G. Smith, C. D. Lindstrom, John J. Bauler, John deGregorio, W. A. Langlais, James G. Darrow and M. Roth, directors. William Langlais is chapter governor. William J. Varley, executive manager for both the San Francisco and San Mateo associations, handled the arrangements, assisted by Robert Frank, representative.

Hit of the San Francisco affair was an impromptu band made up by the entertainer who recruited four contractors, put them in lavish uniform, gave them band instruments and had them "play" by means of a recording.

District 6 Confers

Although labor problems predominate at contractor meetings, the April 17-19 meeting at Gearhart, Ore., of District 6, National Electrical Contractors Assn., covered a more extensive field. Included were bid depository operation, technical and training services, marketing, public relations, legislation and field service of NECA. Some 75 attended from Oregon, Washington and the new state of Alaska. W. R. Grasle, District 6 vice-president, Portland, presided and the Oregon-Columbia Chapter was host.

Charles Scholibo, new Western regional director of NECA, from San Francisco advised on labor matters. Herbert A. Hagen, field representative, also participated.

Establishment of a bid depository in Spokane area was described by Robert Wilkinson, Inland Empire Chapter manager. It differs from most in that all subcontracting trades are participating and general contractors receive their bids directly from the depository.

Increases in apprenticeship were reported from all chapters.

Howard Bayley, president of the Puget Sound Chapter, told of the successful estimating school held in Seattle by the chapter and at which Col. C. P. Bobe, chairman of the national research and training committee, presided.

The new insurance program for employers was discussed and explained by Robert Huenergard of the Oregon-Columbia Chapter.

Next meeting of District 6 will be held the first morning of the Tri-District meeting at Glacier Park, June 22.

H & W for Employers

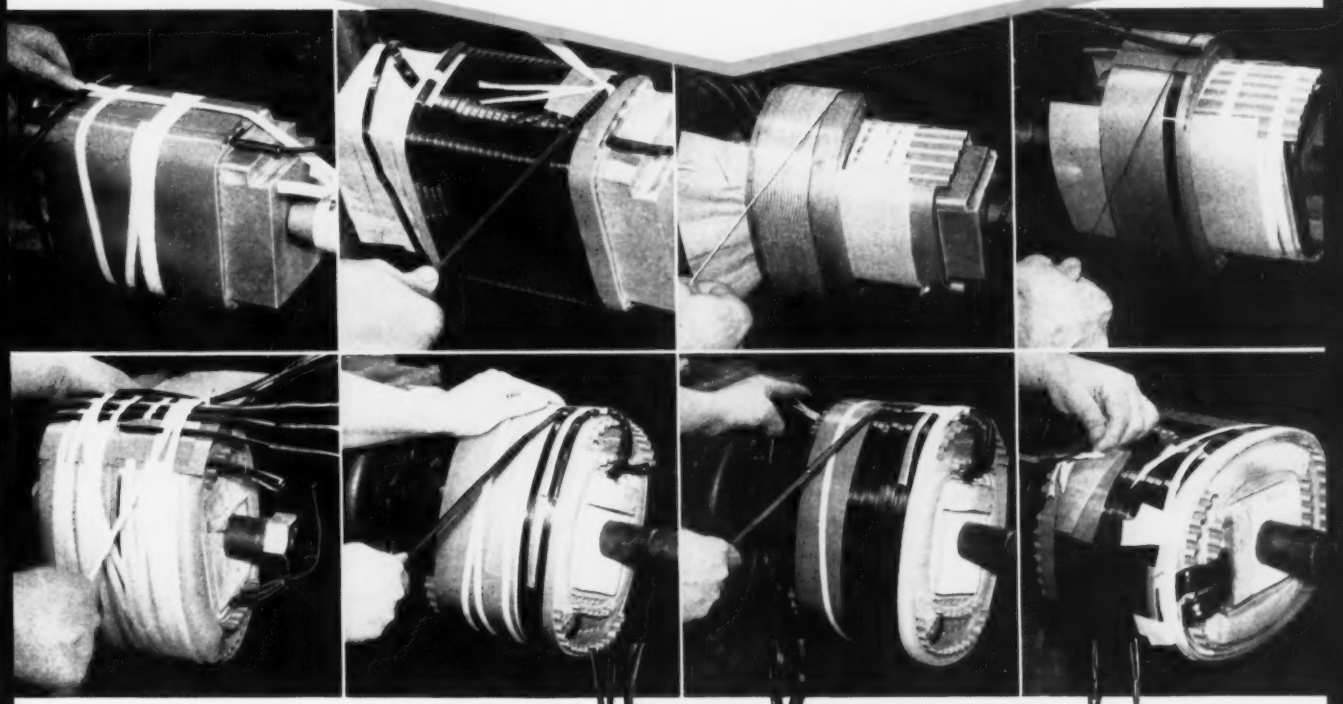
Health and welfare for contractors themselves has been set up by members of District 6, National Electrical Contractors Assn., by means of a trust agreement between members and the establishment of an insurance trust for medical and surgical coverage. Robert E. Huenergard is the Oregon Columbia Chapter trustee; Howard Bayley, Puget Sound Chapter; Rod Anderson, Inland Empire Chapter; and Matt Wilson the Northwest Line Constructors Chapter.

The program was arranged and is administered by Joseph H. Herrle and James B. Nibley, insurance consultants, and underwritten by Bankers Life Co. An increase in benefits and a reduction in premium rate are achieved under the new program.

MOLONEY DISTRIBUTION TRANSFORMER COILS . . . DESIGNED FOR PERFORMANCE

The coils used in Moloney Distribution Transformers are composed of materials especially selected and carefully tested for this specific application. These materials, used under the supervision of experienced transformer design engineers, result in a mechanically-strong, electrically-efficient coil. One feature of this coil is the low impedance which results in improved voltage regulation and therefore increased revenue and better customer relations. Specify the transformers designed for performance . . . Specify Moloney Transformers . . . All Along The Line.

ME59-3

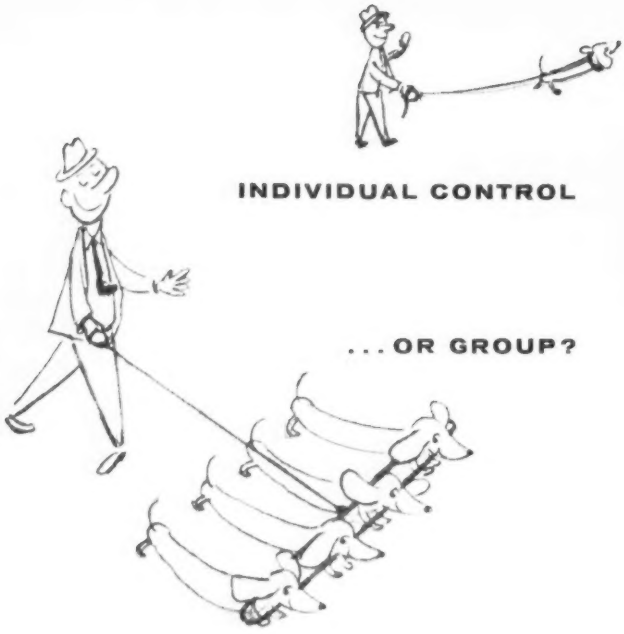


- Turns anchored in place.
- HV winding sectionalized to reduce layer stresses.
- Thermo-setting resin-coated paper used between layers.
- All leads vinyl covered where they are brought through the coil.
- Cooling ducts strategically located.
- LV-HV-LV sequence of coils gives optimum clearance from HV to ground.
- Extra insulation on coil leads, connections and taps.

MOLONEY ELECTRIC COMPANY

Manufacturers of Transformers for Utilities, Industry, and Electronic Applications

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO., AND TORONTO, ONT.



Whether you should use *one* photoelectric control per lamp in your street-lighting circuits — or *one* control plus an auxiliary relay for a *group* of lights — is up to you. Even though the trend for several years has been toward individual control, there are times when one good photoelectric control plus a dependable auxiliary contactor offers a practical and economical way of switching a group of lights. We make equipment for both methods and here's what we have if you prefer pilot wire control or cascading to the one-control-per-lamp method.

The new 250A Multiple Relay is a dependable, simple and inexpensive relaying device that has only two components — both of them well-proven by considerable field service. One is a 30-amp. load contactor which is the same as the one used in thousands of Fisher-Pierce controls for many years; the other is a reliable, expulsion-type lightning arrestor which protects the contactor. A weather-proof cast aluminum housing measures only about 3" x 3" x 2". The 250A will withstand a 300 ampere max. inrush current, a 2500 volt hi-pot, and has SPST double-break contacts available either normally-open or normally-closed.

What the Type 250A has to offer is greater ruggedness, maintenance-free operation, small size and an extremely low price.

F-P also makes a complete line of photoelectric controls; but that's a subject by itself. The main thing is probably not how many "leashes" you have or how they're connected, but *who* makes the vital links that *control* the whole hook-up. The Fisher-Pierce Co., 13 Pearl Street, South Braintree 85, Massachusetts.

FISHER PIERCE

PHOTOELECTRIC LIGHTING CONTROLS

AN AFFILIATE OF SIGMA INSTRUMENTS, INC.

For phone number of closest representative see advertising index in back of book.

People

► **Willis F. "Bill" Archibald** has been appointed assistant sales manager for Swan Mfg. Co., Vancouver, Wash. He will be in charge of Washington state sales for the electric heat manufacturing firm. He was formerly sales manager for a Seattle wholesaler and has been active in the electrical industry since 1930.

Archibald

► **Kenneth W. Hill** is a sales engineer with White-Rodgers Co. in the new San Francisco sales area, covering northern California and Nevada. Also appointed is **H. A. Teasley** as district manager for the company's newly formed Portland sales area. As district manager, he will have responsibility for the sales and service organization in Oregon, Washington, Idaho, western Montana and Alaska.

► **C. H. Connely** has been named Denver area district sales manager for Sylvania Lighting Products. He moves from the Los Angeles district, where he has been assistant manager since 1956.

► **S. N. Donahoe** has been appointed assistant manager of the South Pacific district, Westinghouse Electric Corp. He will locate at Los Angeles district headquarters. Donahoe succeeds **Charles E. Hammond**, who was promoted to manager of industrial sales in East Pittsburgh, Pa.

Donahoe

► **M. A. Hooper** has been appointed branch manager for Graybar Electric Co. Inc. at Butte, and **S. L. Dye** as branch manager at Portland.

► **Robert W. Henkel** has been appointed manager of the news bureau of Hoffman Electronics Corp. He was formerly with Fairchild Publications Inc., and also *Wall Street Journal*.

► **Hugh A. Young** has joined Hallicrafters Co. as West Coast technical marketing consultant. He will headquarter in Los Angeles. He was formerly sales manager of the Technical Products Division, Packard-Bell Electronics Corp. He previously served in a similar post with Hoffman Laboratories, Motorola and Allen B. DuMont Labs. He is a graduate of the University of California, with a degree in electrical engineering.

Young

► **R. A. Moody,** assistant treasurer and tax consultant with Southern California Edison Co., has retired after an Edison career of 40 years.

► **Claude C. "Bud" Conners** is construction manager of the 75,000-kw nuclear power reactor being built for Consumers Public Power District in Nebraska by Atomics International.

► **Herbert S. Thompson,** district sales manager at Pomona for Southern California Edison Co., has retired after 31 years with the company.

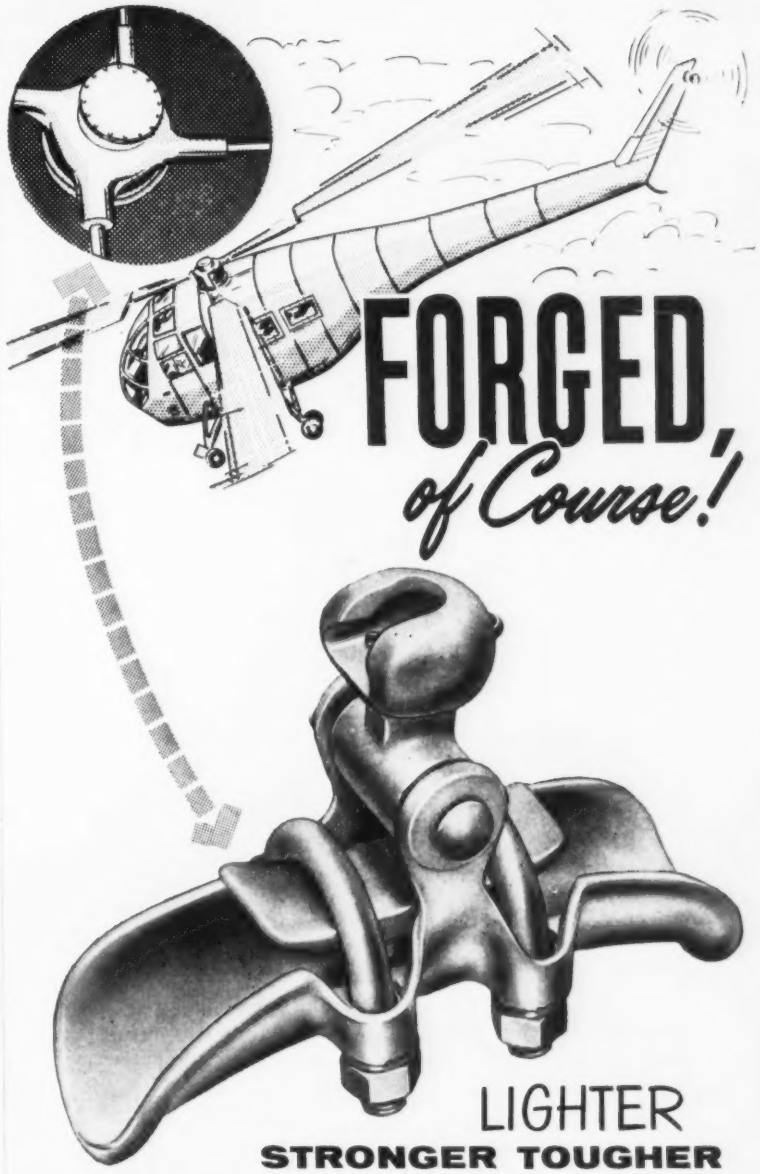
► **Robert W. Erskine** has been named Portland sales supervisor for Sylvania Lighting Products Division, Sylvania Electric Products Inc.

► **Chuck Martin** is a new field sales representative for White-Rodgers Co. in the Intermountain area. He will headquarter in Denver. In the new position he will handle the entire line of heating, air conditioning and refrigeration controls.

► **Jay R. Mason,** hydroelectric power project superintendent at the Corps of Engineers Detroit Dam, retired March 31.

► **Oliver E. Owen Jr.** was named chief right-of-way engineer of San Diego Gas & Electric Co., to succeed William F. Garber, who retired recently.

► **Conrad Hjalmarson** has been named superintendent of plant construction for San Diego Gas & Electric Co., succeeding his uncle, Magnus Hjalmarson, who retired. Magnus Hjalmarson is being retained as a consultant in plant construction.



Drop Forged Aluminum and Steel

BTC **Suspension Clamps**

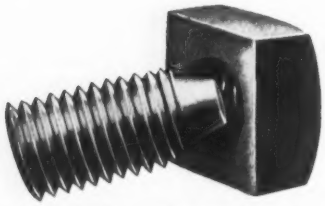
Long Conductor Life Insurance
No excessive wear on connecting surfaces
No bore size allowance necessary
Wide range of sizes
Specify the best—BTC Hi-Line Hardware

THE BREWER-TITCHENER CORPORATION
HI-LINE HARDWARE DIVISION • CORTLAND, N.Y.

DEPENDABLE POLE LINE CONSTRUCTION *DEMANDS*

Cross Arm Braces

"HANDIDRIVE" Pole Steps



Handipoint **Bolts and Rods**

High Tensile Bolt Guy Clamps

Manufactured and Stocked For Your Convenience On The Pacific Coast

KORTICK

MANUFACTURING COMPANY
5600 Third Street, San Francisco 24
Telephone VAlencia 6-6107

SALES OFFICES & WAREHOUSE STOCKS AT

Maydwell & Hartzell, Inc.
Los Angeles & San Francisco, Calif.
Seattle & Spokane, Wash.
Portland, Oregon Phoenix, Arizona

NATIONAL ELECTRIC SUPPLY CO.
HONOLULU, T.H.

► **Albert S. C. Chong** has joined the staff of Park & Yee, engineers and architects, Honolulu, as head of the new electrical division.

► **Robert W. Rayburn** has been appointed San Francisco and Seattle area sales manager for the Electrical Products Division of Minnesota Mining & Mfg. Co. He will headquarter at the San Francisco office.

► **Kent J. Worthen,** former Los Angeles district manager for General Electric two-way radio, has been named national manager of product planning for point-to-point communication in G-E's communication products department at Lynchburg, Va.

► **C. E. Oswald** has joined Electrical Estimators in Los Angeles, to be in charge of switchboard and fixture surveys for the company. Much of his work will be at Vandenberg, Edward and March Air Force Bases, and at Lemoore Naval Air Station.

► **J. S. McMahon** has been named manager of a new organization charged with the responsibility for the new production reactor of General Electric Co. at Hanford Works. The reactor is expected to start producing plutonium some time in 1962. The Atomic Energy Commission has approved convertible features in the $145,000,000 reactor that will make it possible to add power producing facilities later.

► **Clarence C. Davis,** former resident engineer at Ice Harbor Dam for the Corps of Engineers, has been named chief of the construction division of the Walla Walla district office. He replaces **Oliver A. Lewis,** who retired in March.

► **Wallace B. Haughan** is a new director of the Peace River Power Development Co. Ltd. Haughan is president of John Laing & Son Ltd., one of the world's largest engineering and construction companies, and a major stockholder in PRPD.

► **A. R. Luckner** has been appointed assistant labor relations manager of British Columbia Electric Co. Replacing him as supervisor of the employment section will be **R. H. Downey.**

► **A. Bruce Robertson** has been promoted to vice-president and general counsel of British Columbia Electric Co. Succeeding him as head of the company's legal division is **D. M. M. Goldie.**

COOL & SWEET

Plastic Insulated Water Canteen

One gallon capacity—$75 per dozen
(FOB San Gabriel)

- keeps water cold six hours or more
- will not corrode
- keeps water tasteless and odorless
- non-conductor
- convenient pocket for paper cups
- replaceable cover and insulation
- unbreakable
- lightweight—20 oz.
- packed in cartons of 12 each
- weight per carton—20 lbs.
- heavy duty denim cover

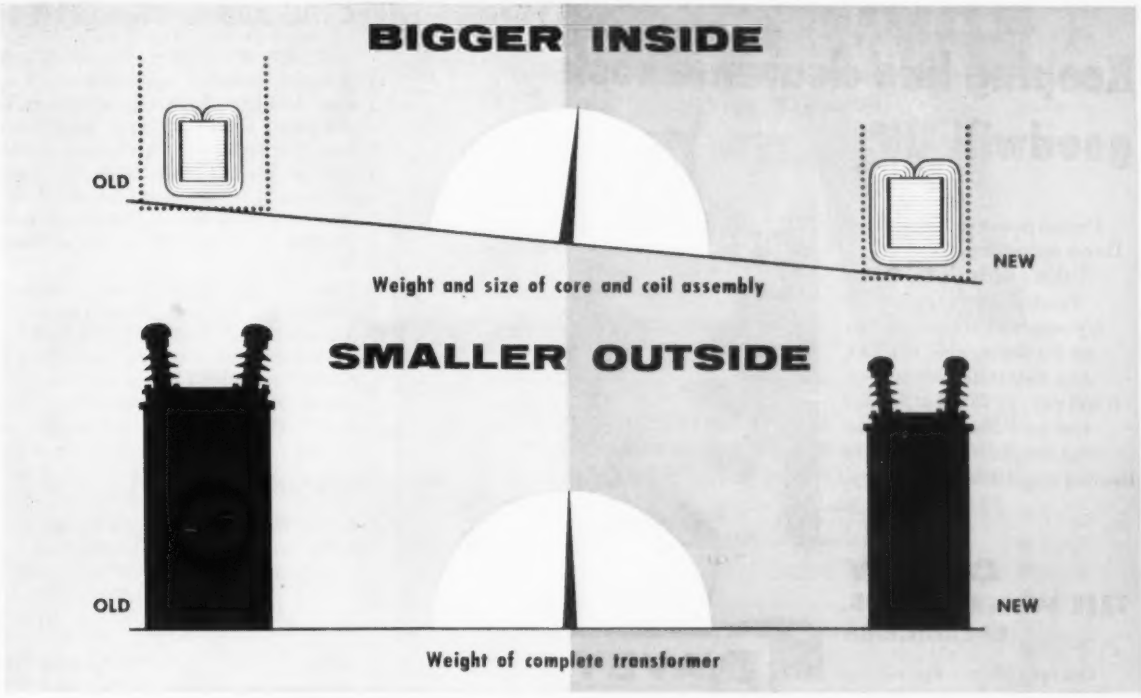
T. A. FORD COMPANY, Inc.
320 South San Marino Avenue
San Gabriel, Calif. CU 3-5116

NEEDED NOW!

ELECTRONIC ENGINEERS in ALASKA

$5430 to $8810 per annum plus 25% cost-of-living allowance. Enjoy a career in the Federal Civil Service with paid annual and sick leave, retirement benefits, paid transportation to Alaska and return for leave purposes. Positions in Federal career service. Contact:

Federal Aviation Agency
P. O. Box 440, Anchorage, Alaska



Here's why you get more for your transformer dollars this year

NEW KUHLMAN DESIGNS ARE *BIGGER* INSIDE, *SMALLER* OUTSIDE

Larger core and coil, using more copper and steel, provide lower losses, improved impedance, and better regulation. A smaller tank takes up less room on the pole and offsets the increased size and weight of the stepped-up core and coil.

With the new Kuhlman '59 Transformer—bigger inside, smaller outside—Kuhlman engineers continue the advances begun with the Kuhlman "Bent Iron" Core. For more than a quarter-century, this has been the most-used principle, industry-wide, to achieve highest transformer efficiency at the lowest possible weight. With the improvement in steel, the Bent Iron Core has done more than any other single thing to make today's lightweight pole transformer possible.

"Bigger inside, smaller outside" is one of the reasons why Kuhlman's 65th year is a big year for you. This year, more than ever, you get more for your transformer dollar from Kuhlman.

Get all the facts from the Kuhlman representative near you.

ALL NEW INSIDE . . .

Conventional above 5KV | Conventional 5KV and below | CSP* | Rural

KUHLMAN ELECTRIC COMPANY

65 years

the year you get more for your transformer dollars

KUHLMAN TRANSFORMERS

KUHLMAN ELECTRIC COMPANY General Offices: Birmingham, Michigan

WESTERN DIVISION • SALINAS, CALIFORNIA

Keeping line clearance costs DOWN goodwill UP

Proven power equipment and Davey trained rope climbers . . . that's what makes Davey Surgical Line Clearance so economical. Utilities can rely on the dependable, efficient, and *adaptable* Davey crew. It will pay you to talk over your tree maintenance problems with the West's leading line clearing specialists—Call Davey.

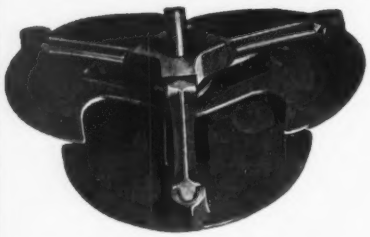
DAVEY
TREE SURGERY CO., LTD.
OF CALIFORNIA
SAN FRANCISCO • Russ Building
LOS ANGELES • Story Building

First in the Field! Quality Photo-electric Street Lighting Controls!

WRITE TODAY FOR COMPLETE DATA

SunSwitch
DIVISION
RIPLEY COMPANY, INC., MIDDLETOWN, CONN.

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life



EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

For phone number of closest representative see advertising index in back of book.

Curtis-AllBrite Changes

Robert H. Hirte has been appointed general sales manager of the AllBrite Lighting Division of the new Curtis-AllBrite Lighting Inc. He has been district sales manager at Los Angeles for many years. Hirte will headquarter in San Francisco and will be in charge of sales for the western half of the United States.

In the northern California sales district W. L. "Bill" Eliot will cover Alameda and Contra Costa County territories and Alon D. "Lon" Montgomery has been appointed as sales engineer in the San Francisco, Marin and North Coast area.

Executives Elected

Election of a new vice-president and a treasurer and appointment of a controller have been announced by Puget Sound Power & Light Co.

Fontaine

Edward A. Fontaine, manager of the electric department of the Stone & Webster Service Corp. of New York, was elected vice-president of operations and J. E. Anderson, formerly controller of Puget Sound P&L., was elected treasurer. Succeeding Anderson as controller will be John H. King who was formerly auditor of the company. King will also serve as assistant treasurer.

► **William R. Daily** has been appointed purchasing agent of the Los Angeles plant of Square D Co. He has been assistant purchasing agent of the same plant for the past four years. He joined the firm in 1951 as a buyer. Daily replaces **Philip Rypinski,** who became purchasing consultant for the Los Angeles plant on March 1.

Daily

► **Lt. Col. Paavo B. Carlson** has been appointed Denver area engineer for the U. S. Corps of Engineers. He will supervise construction in the Denver area, including Titan missile base facilities at Lowry bombing range.

Deaths

► **George A. Whitely,** 60, Palouse division manager of Washington Water Power Co., died in mid-March in Spokane. He began his utility career in 1923 with Kootenai Power Co. at Coeur d'Alene, Idaho. He became a member of WWP's staff in 1930 when Kootenai was purchased by WWP.

► **Austin W. Zingg,** 52, chief of the watershed technology branch of the U. S. Department of Agriculture Research Service at Fort Collins, Colo., died at Denver on April 7.

► **Donald A. Leggett,** 31, mayor of Covina, Calif., and an electrical engineer with Randolph Engineering Co., died March 10 while undergoing treatment for acute leukemia.

► **Alton W. Leonard,** 85, retired president of Puget Sound Power & Light Co., died March 11 after a brief illness. He was president of the company from 1911 until retirement in 1931.

► **Charles C. Snyder,** retired business agent for Los Angeles Department of Water & Power, died March 29 in Los Angeles.

► **Warren H. McBryde,** 83, noted Bay Area consulting engineer, died recently. Early in his career he had worked for companies that later were merged with Pacific Gas and Electric Co., and at one time he was in charge of all California engineering and construction of E. I. du Pont de Nemours & Co.

► **Fay Lemoge,** 48, who succeeded his colorful pioneer contractor father, Vic Lemoge, as owner of Lemoge Electric Co., San Francisco, himself died of a stroke on March 4, 1959. Unlike his father, he was a shy man and took little part in association affairs except to serve as president of the Electrical Industry Depository. His most recent big job was the 22-story Equitable Building finished last year.

► **Herbert H. Horn,** radio and TV pioneer in California, died recently in Palm Springs, Calif. He was founder of the manufacturing of Tiffany Tone radios, and expanded into television in the partnership of Horn & Cox in 1952.

► **William E. Lawton,** 41, Northwest power manager for Aluminum Co. of America, died Jan. 21.

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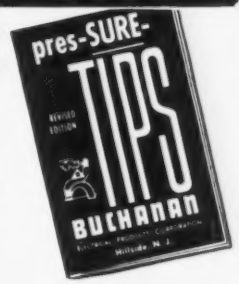

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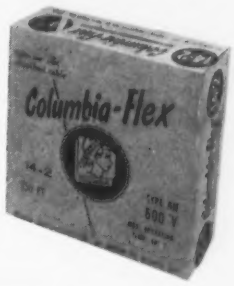

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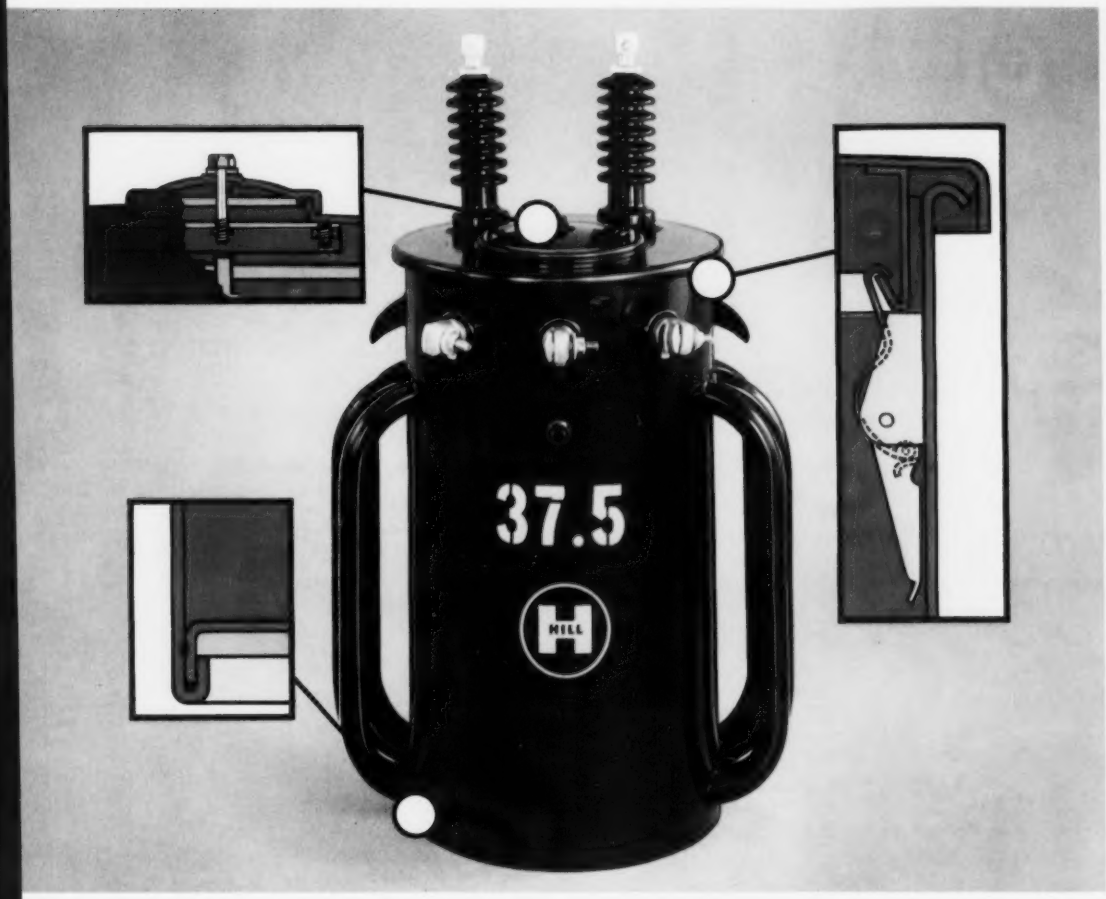

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